DRAFT

WETLAND AND STREAM MITIGATION PLAN

FOR THE

ROCKY RIVER LOWER RESERVOIR EXPANSION

CHATHAM COUNTY, NORTH CAROLINA

Prepared By:

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Submitted 24 May 2004

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&

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401 Wetland Certification Unit
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DRAFT

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CHATHAM COUNTY, NORTH CAROLINA

USACOE Action ID No. 200220234 NC DWQ Project No. 01-1729

INTRODUCTION

The Town of Siler City (Town) is proposing to construct a new dam structure immediately below the existing Rocky River Lower Reservoir dam in order to expand the existing Rocky River Lower Reservoir. The expansion of this reservoir will establish a water supply that will provide an additional 2.0 million gallons per day (MGD) to meet the Town's projected long-term needs beyond the current 20-year planning window through at least 2030, based on current population and demand projections. The project would result in the establishment of a 162.5-acre reservoir (including 24.4 acres of existing reservoir) and the preservation of a 117.3-acre buffer zone approximately 100 feet wide around the proposed reservoir. The project engineers, Hobbs, Upchurch and Associates, P.A., are preparing a timeline that will outline the dam construction schedule and filling of the proposed reservoir. This timeline will be submitted as a supplemental document to this mitigation plan.

Project construction would result in the loss of 9.19 acres of jurisdictional wetlands and inundation of 7,916 linear feet of perennial streams, 1,588 linear feet of intermittent streams and 3,242 linear feet of ephemeral streams. The majority of existing wetlands and streams have been adversely affected by human activities including cattle grazing.

As part of this project, the Town's will work to improve the environmental quality of the project site and watershed as a whole. A 100-foot vegetative buffer around the expanded reservoir will be established and all wetlands and streams within this buffer will be preserved, enhanced or restored, as appropriate. Water quality and wildlife habitat will be enhanced by the formation of 32 fringe wetlands and creation of 2 wetlands within the footprint of the proposed reservoir expansion. In addition to the on-site mitigation, the Town will purchase stream mitigation credits created by the removal of a dam on the Deep River and wetland acreage at the head of the Rocky River in Randolph County will be enhanced and preserved.

PROJECT SITE DESCRIPTION

The project area is located in western Chatham County in the east-central Piedmont of North Carolina (Figure 1). The topography ranges from gently to strongly sloping. Elevations within the project area range from 450 to 700 feet above Mean Sea Level (MSL). Geologically, the project lies within the Carolina Slate Belt of North Carolina. The soils are generally silt loams and silty clay loams, with the Badin, Cid, Lignum, Georgeville and Nanford Series being the most widespread. Soils along rivers and creeks, which ultimately drain to the Cape Fear River, are dominated by Riverview and Badin-Nanford soils (H.Outz, Chatham Soil and Water Conservation District, pers. comm.).

The predominant natural vegetative communities as defined by the North Carolina Natural Heritage Program (NCNHP) (Schafale and Weakley 1990) were the Dry Oak-Hickory Forest on the ridgetops and upper slopes, Dry-Mesic Oak-Hickory Forest on mid-and lower slopes, Piedmont/Coastal Plain Heath Bluff on steep slopes and banks, Mesic Mixed Hardwood Forest on some lower slopes and along some well-drained small creek bottoms and Piedmont Alluvial Forest on river and stream floodplains.

The Dry Oak-Hickory Forest was dominated by white oak (*Quercus alba*), southern red oak (*Q. falcata*), post oak (*Q. stellata*), blackjack oak (*Q. marilandica*) and hickory species, including mockernut hickory (*Carya tomentosa*) and pignut hickory (*C. glabra*). Shortleaf (*Pinus echinata*) and Virginia pines (*P. virginiana*) were also important components and dominated portions of this community type. Typical understory species included sourwood (*Oxydendrum arboreum*), red maple (*Acer rubrum*), flowering dogwood (*Cornus florida*) and sparkleberry (*Vaccinium arboreum*). Shrubs ranged from sparse to dense and included gooseberry (*V. stamineum*), lowbush blueberry (*V. pallidum*) and dwarf blueberry (*Vacinium tenellum*). Herbs were generally sparse and included pipsissewa (*Chimaphila maculata*), oat grass (*Danthonia spicata*), rattlesnake weed (*Hieracium venosum*), goat's rue (*Tephosia virginiana*) and greater coreopsis (*Coreopsis major*).

The Dry-Mesic Oak-Hickory Forest was dominated by white oak and other oaks and hickories including northern red oak (*Q. rubra*), black oak (*Q. velutina*), shagbark hickory (*C. ovata*) and pignut hickory. Pines, tulip poplar (*Liriodendron tulipifera*) and sweetgum (*Liquidambar styraciflua*) were also common. Understory species included red maple, flowering dogwood, sourwood, American holly (*Ilex opaca*) and blackgum (*Nyssa sylvatica*). Shrubs included gooseberry, dangleberry (*Gaylussacia frondosa*) and American strawberry-bush (*Euonymus americanus*). The herb layer was sparse and included heartleaf (*Hexastylis arifolia*),

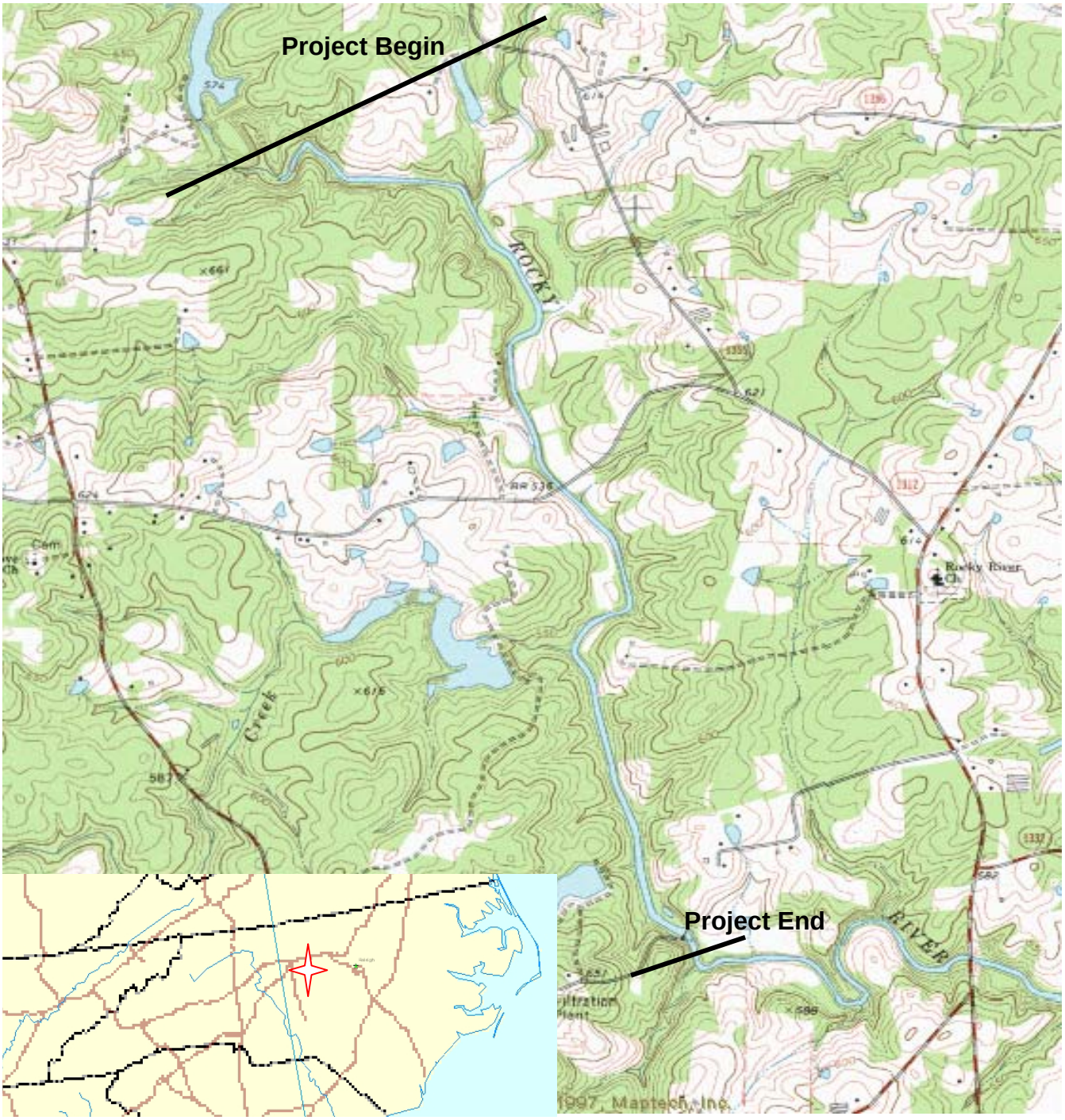

FIGURE 1

PROJECT LOCATION MAP
ROCKY RIVER LOWER RESERVOIR EXPANSION
CHATHAM COUNTY, NORTH CAROLINA

Prepared By:
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Southern Pines, North Carolina

pipsissewa, rattlesnake plantain (*Goodyera pubescens*) and woodland tick-trefoil (*Desmodium nudiflorum*).

Piedmont/Coastal Plain Heath Bluff contained an open to very sparse overstory of rock chestnut oak (*Q. prinus*) and shortleaf pine. A variety of trees from surrounding forests also occurred in this community as did a dense shrub layer dominated by mountain laurel (*Kalmia latifolia*). Herbs were generally sparse and included galax (*Galax aphylla*), trailing arbutus (*Epigae repens*), pipsissewa and partridge berry (*Mitchella repens*).

Dominant overstory species within the Mesic Mixed Hardwood Forest community included beech (*Fagus grandifolia*), northern red oak, tulip poplar and southern sugar maple (*Acer barbatum*). Typical understory species included flowering dogwood, red maple and American holly. Common shrub species included horse sugar (*Symplocos tinctoria*), witch-hazel (*Hammamelis virginiana*), buckeye (*Aesculus sylvatica*), switch cane (*Arundinaria tecta*), American strawberrybush, beautyberry (*Callicarpa americanus*) and blueberries (*Vaccinium* spp.). Ground cover was moderately dense to dense and often diverse, and included Christmas fern (*Polystichum acrostichoides*), heartleaf (*H. virginica*), foamflower (*Tiarella cordifolia*), rattlesnake fern (*Botrychium virginianum*), alumroot (*Heuchera americana*) and lion's foot (*Prenanthes serpentaria*).

Dominant overstory species in the Piedmont Alluvial Forest community type included river birch (*Betula nigra*), tulip poplar, sweetgum, green ash (*Fraxinus pennsylvanica*), black walnut (*Juglans nigra*), hackberry (*Celtis laevigata*) and sycamore (*Platanus occidentalis*). Typical understory species included boxelder (*Acer negundo*), red maple and ironwood (*Carpinus caroliniana*). Shrubs included American strawberrybush, spicebush (*Lindera benzoin*) and Chinese privet (*Ligustrum sinese*). The ground cover was generally dense and included vermin grass (*Microstegium virmineum*), bluestem goldenrod (*Solidago caesia*), heartleaf aster (*Aster divaricatus*), buttercup (*Ranunculus abortius*), Canada avens (*Geum canadense*) and violets (*Viola* spp.). Vines were common and included poison ivy (*Toxicodendron radicans*), muscadine grape (*Vitis rotundifolia*), greenbrier (*Smilax rotundifolia*), Virginia creeper (*Parthenocissus quinquefolia*) and moonseed (*Menispermum canadense*).

The entire site has been heavily disturbed by human impacts. Nearly half of the uplands have been converted to fields, pastures and rural residential areas. Forested areas were generally small and fragmented.

IMPACTS DUE TO THE PROPOSED ROCKY RIVER LOWER RESERVOIR

Stream Impacts

A total of 12,746 linear feet of stream channels will be permanently flooded by the proposed project. Of this total, 3,242 linear feet are ephemeral streams, which do not require mitigation by State or Federal agencies. The perennial and intermittent streams to be mitigated total 9,504 linear feet. On 18 March 2002, the United States Army Corps of Engineers (USACOE) visited the project site and made jurisdictional determinations on waterbodies therein. It was determined that some of the delineated channels were nonjurisdictional due to the lack of stream characteristics and were either ditches or water impoundments. Table 1 details the linear footage of stream impacts approved by the USACOE.

TABLE 1

STREAM IMPACTS FOR THE ROCKY RIVER LOWER RESERVOIR EXPANSION PROJECT

Stream Type	Linear Feet of Stream Channel Impacts
Perennial-Forested	6,332.83
Perennial-NonForested	1,583.56
Intermittent Forested	1,200.23
Intermittent-NonForested	387.60
TOTAL	**9,504.00**

Wetland Impacts

Total jurisdictional wetland impacts were reported earlier as 9.24 acres. In April 2004, Dr. J.H. Carter III & Associates (JCA) determined by field verification that .05 acre of previously reported wetland impact was the result of mapping errors. This acreage occurs along Mudlick Creek and along the upper reaches of the Rocky River Lower Reservoir. The banks of Mudlick Creek and the Rocky River were surveyed using the Global Positioning System (GPS) and this data was translated into a graphical representation. When an existing graphic of the Rocky River and Mudlick Creek were combined with the field data, portions of the banks of these waterbodies were erroneously reported as wetlands. Therefore, construction and operation of the proposed project will impact 9.19 acres of jurisdictional wetlands and not 9.24 acres as previously reported. This includes 1.52 acres of isolated wetland and 7.67 acres of riparian wetland. Figures 2a through 2c shows the location of these wetlands and the areas removed from the wetland impact calculation. Many of the wetlands proposed to be impacted are disturbed or narrow riparian fringe. All wetland impacts will be the result of flooding.

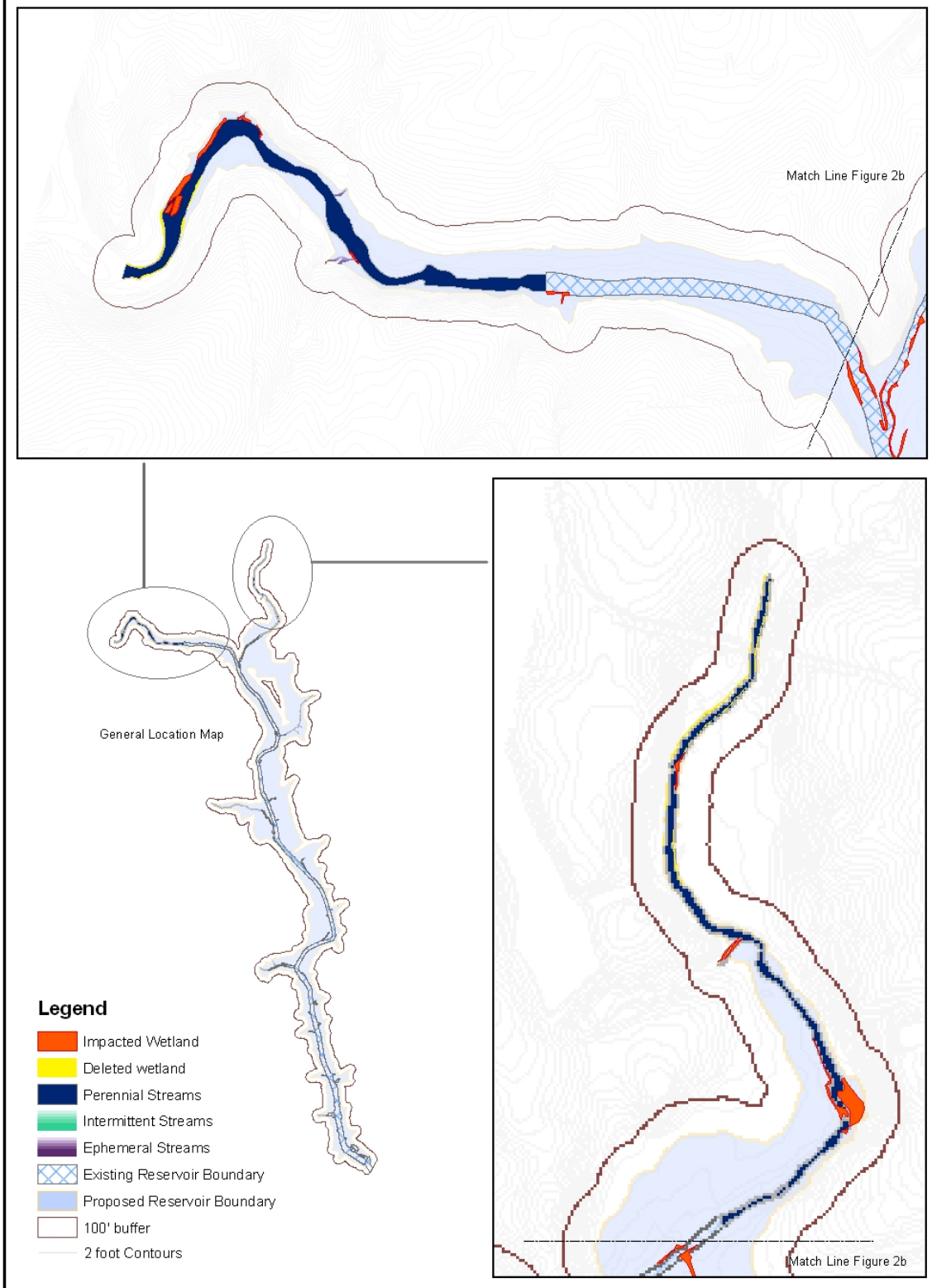

FIGURE 2A

April 13, 2004

JURISDICTIONAL WETLAND AND STREAM CHANNEL IMPACTS
ROCKY RIVER LOWER RESERVOIR EXPANSION
CHATHAM COUNTY, NORTH CAROLINA

0 145 290 580 Feet

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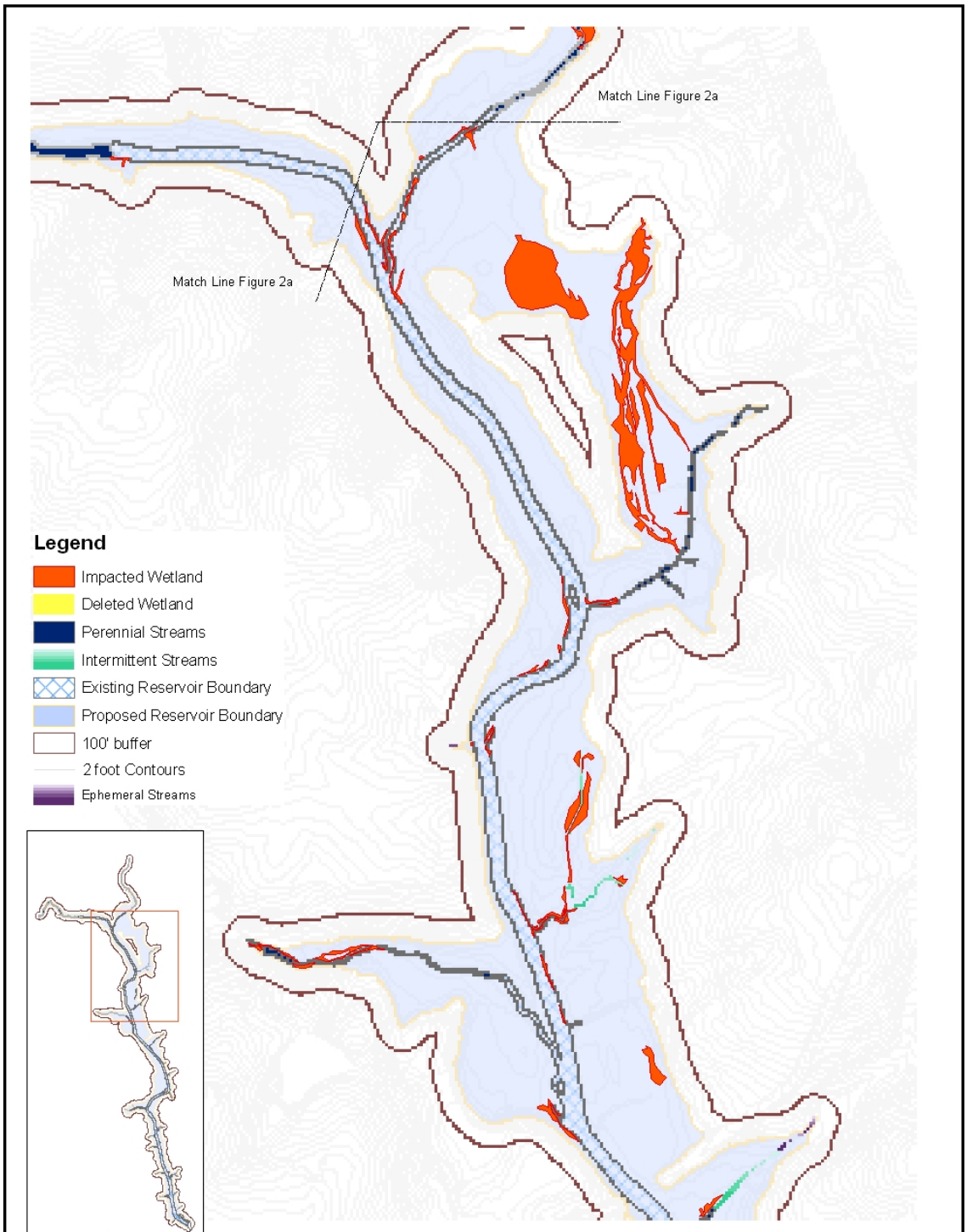

April 13, 2004

FIGURE 2B

JURISDICTIONAL WETLAND AND STREAM CHANNEL IMPACTS
ROCKY RIVER LOWER RESERVOIR EXPANSION
CHATHAM COUNTY, NORTH CAROLINA

0 190 380 760 Feet

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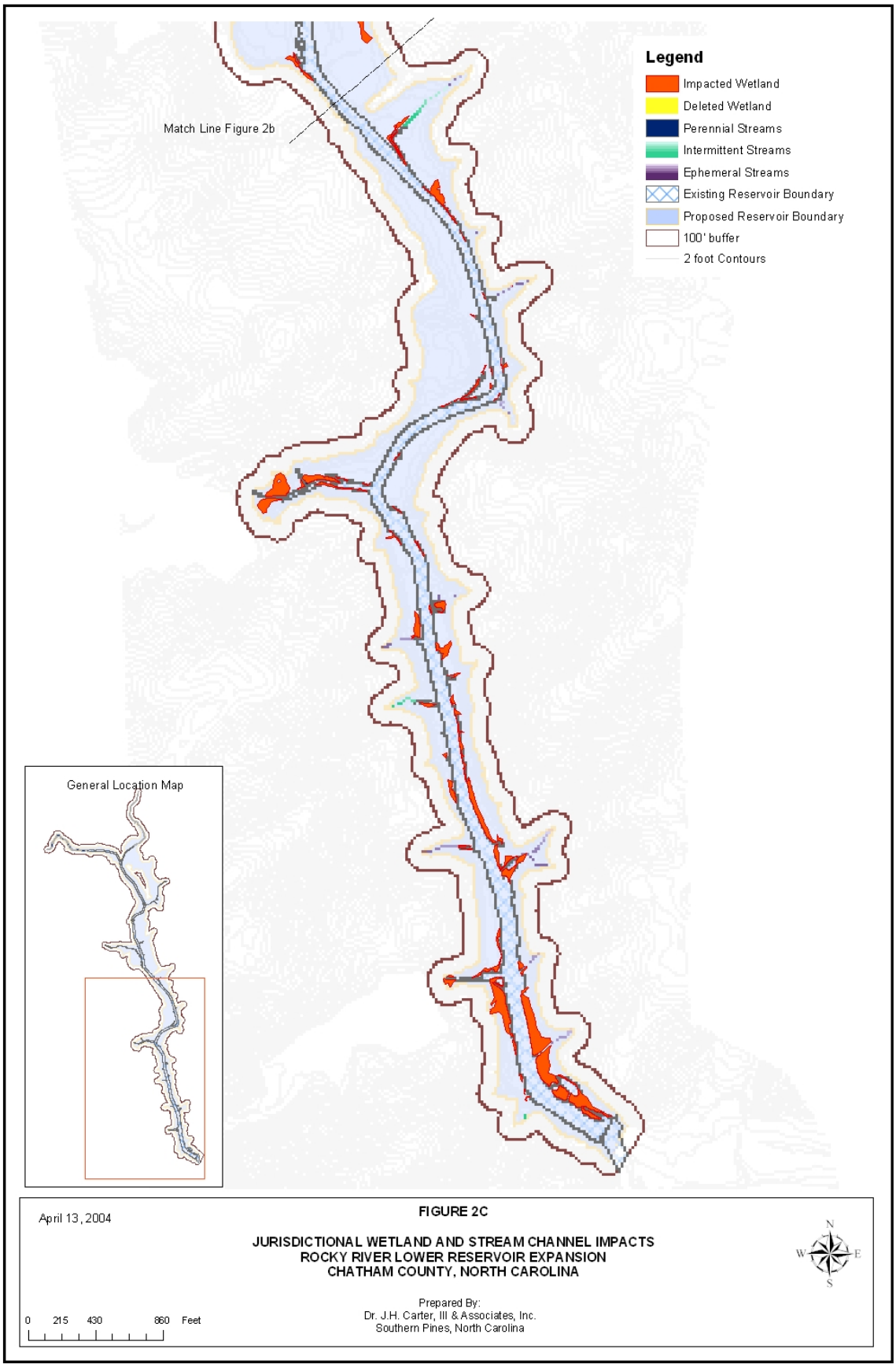
Match Line Figure 2b
Legend
Impacted Wetland
Deleted Wetland
Perennial Streams
Intermittent Streams
Ephemeral Streams
Existing Reservoir Boundary
Proposed Reservoir Boundary
100' buffer
2 foot Contours
General Location Map
April 13, 2004
FIGURE 2C
JURISDICTIONAL WETLAND AND STREAM CHANNEL IMPACTS
ROCKY RIVER LOWER RESERVOIR EXPANSION
CHATHAM COUNTY, NORTH CAROLINA
Prepared By:
Dr. J.H. Carter, III & Associates, Inc.
Southern Pines, North Carolina
0 215 430 860 Feet
N
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S

PROPOSED STREAM MITIGATION

To mitigate for stream channel impacts, the Town proposes to purchase mitigation credits generated by the Carbonton Dam removal project on the Deep River, as well as on-site enhancement and preservation. Table 2 outlines the proposed stream channel mitigation activities. It is expected that the Carbonton Dam removal project will meet the Town's stream channel mitigation requirements and that on-site stream channel mitigation will be supplemental stream channel mitigation.

TABLE 2
PROPOSED MITIGATION FOR STREAM CHANNEL IMPACTS

Mitigation Activity	Mitigation in Linear Feet*	Mitigation to Impact Ratio	Mitigation Credit in Linear Feet
Deep River Restoration	N/A	N/A	9,600
On-Site Stream Enhancement	224.5	4:1	56.13
On-Site Stream Preservation	528.10	10:1	52.81
TOTAL	**752.60**		**9708.94**

* Linear Feet estimated

Deep River Restoration

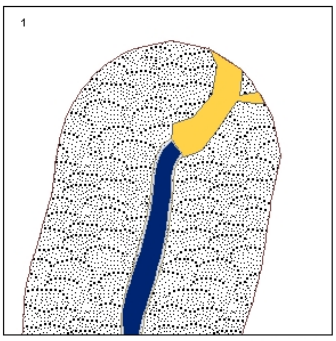
The Town is in the process of purchasing 9,600 feet of stream channel mitigation credits (Table 2) generated by the Carbonton Dam removal project on the Deep River near the Lee-Chatham County line, North Carolina. The Carbonton Dam removal project will restore the natural stream channel characteristics and river flow of approximately 10 river miles of the Deep River.

On-Site Stream Enhancement

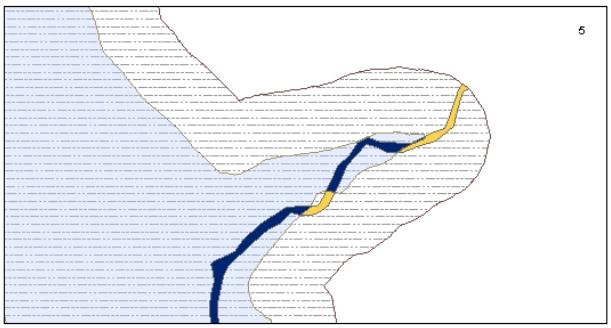
Approximately 245 linear feet of non-forested streams within the proposed reservoir's 100-foot buffer will be revegatated with river birch, tulip poplar, green ash and sycamore. The locations of these streams are shown in Figure 3.

On-Site Stream Preservation

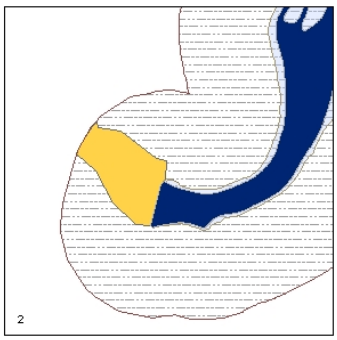
Approximately 528 linear feet of forested stream channel within the reservoir's 100-foot buffer will be preserved. The locations of these streams are shown in Figure 3.



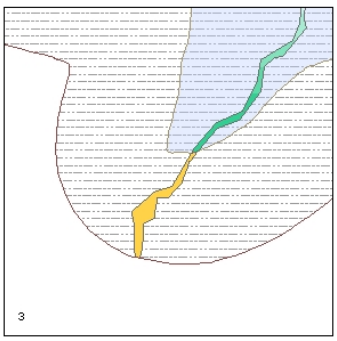
Enhancement



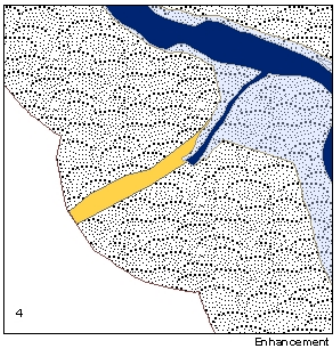
Preservation



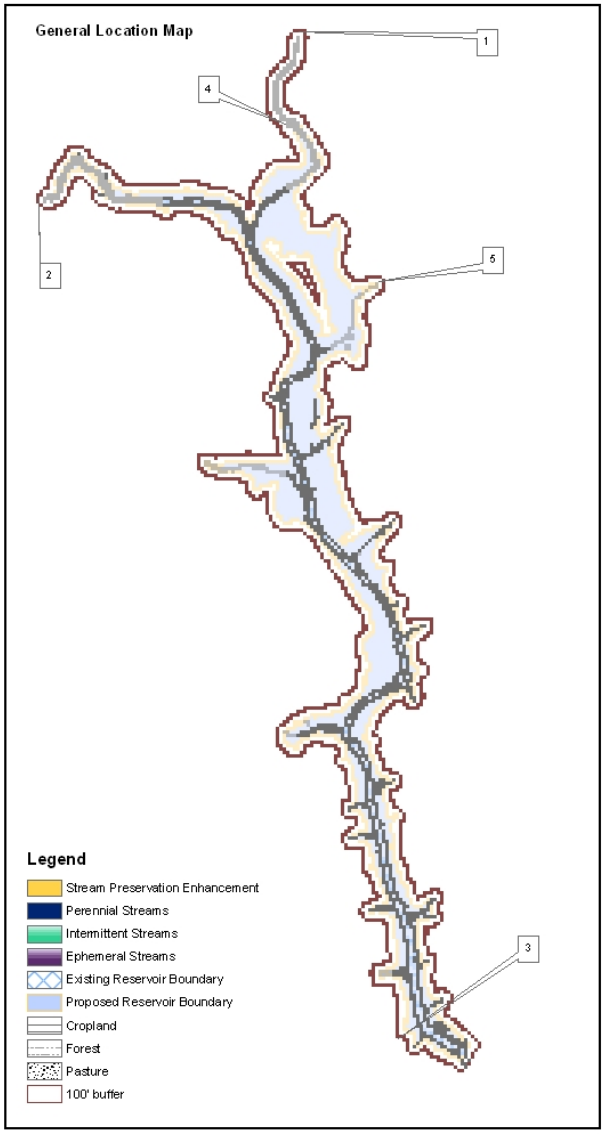
Preservation



Preservation



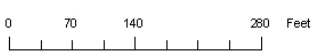
Enhancement



April 16, 2004

FIGURE 3

LOCATIONS OF ON-SITE STREAM MITIGATION
ROCKY RIVER LOWER RESERVOIR EXPANSION
CHATHAM COUNTY, NORTH CAROLINA



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PROPOSED WETLAND MITIGATION

On-site wetland mitigation is preferred in order to maintain and improve the water quality of the proposed reservoir. Approximately, 21.81 acres of potential mitigation has been identified on-site. For the 7.67 acres of non-isolated wetlands impacted by the proposed project, 1.89 acres will be restored, an additional 14.32 acres will be created, and 3.57 acres of fringe wetland are projected to naturally develop. In addition, within the 100-foot reservoir buffer 0.15 acre of wetland will be preserved and 0.16 acre will be enhanced. Off-site, 0.30 acre of wetland preservation and 3.23 acres of wetland enhancement have been identified. All mitigation properties will be placed into a conservation easement and preserved in perpetuity by donation to a land trust or similar organization.

Table 3 outlines the proposed wetland mitigation activity to meet requirements for wetland impacts regulated by the USACOE. Table 4 outlines the proposed wetland mitigation needed to meet requirements for wetland impacts regulated by the North Carolina Department of Water Quality (DWQ). HUA is preparing construction timelines for the wetland creation sites which will be provided as a supplemental document to this mitigation plan. A detailed discussion of each proposed mitigation activity follows.

TABLE 3

SUMMARY OF PROPOSED WETLAND MITIGATION
FOR FEDERAL JURISDICTIONAL WETLANDS (7.67 acres)

Mitigation Activity	Mitigation Acreage	Mitigation to Impact Ratio	Mitigation Credit Acreage
On-Site Wetland Creation (MW-01 and MW-02)	14.32	3:1	4.77
On-Site Wetland Restoration (MW-01)	1.89	1.5:1	1.26
Wetland Fringe	3.57	3:1	1.19
On-Site Wetland Preservation (within 100-foot Buffer)	0.15	10:1	0.02
On-Site Wetland Enhancement (Within 100-foot Buffer)	0.16	4:1	0.04
Off-Site Wetland Enhancement (Parcel No. 878735049459)	3.23	4:1	0.81
Off-Site Wetland Preservation (Parcel No. 878735049459)	0.30	10:1	0.03
TOTAL	**23.62**		**8.12**

TABLE 4

SUMMARY OF PROPOSED WETLAND MITIGATION FOR STATE JURISDICTIONAL ISOLATED WETLANDS (1.72 acres)

Mitigation Activity	Mitigation Acreage	Mitigation to Impact Ratio	Mitigation Credit Acreage
On-Site Wetland Creation within MW-01	1.72	1:1	1.72
TOTAL	**1.72**		**1.72**

On-Site Wetland Mitigation

On-site wetland mitigation will include restoration, creation, preservation and enhancement of wetlands within the project site. Table 5 lists each on-site mitigation activity and Figures 4 and Figures 5a-5d show the locations of these mitigation areas. A discussion of these proposed mitigation activities follows.

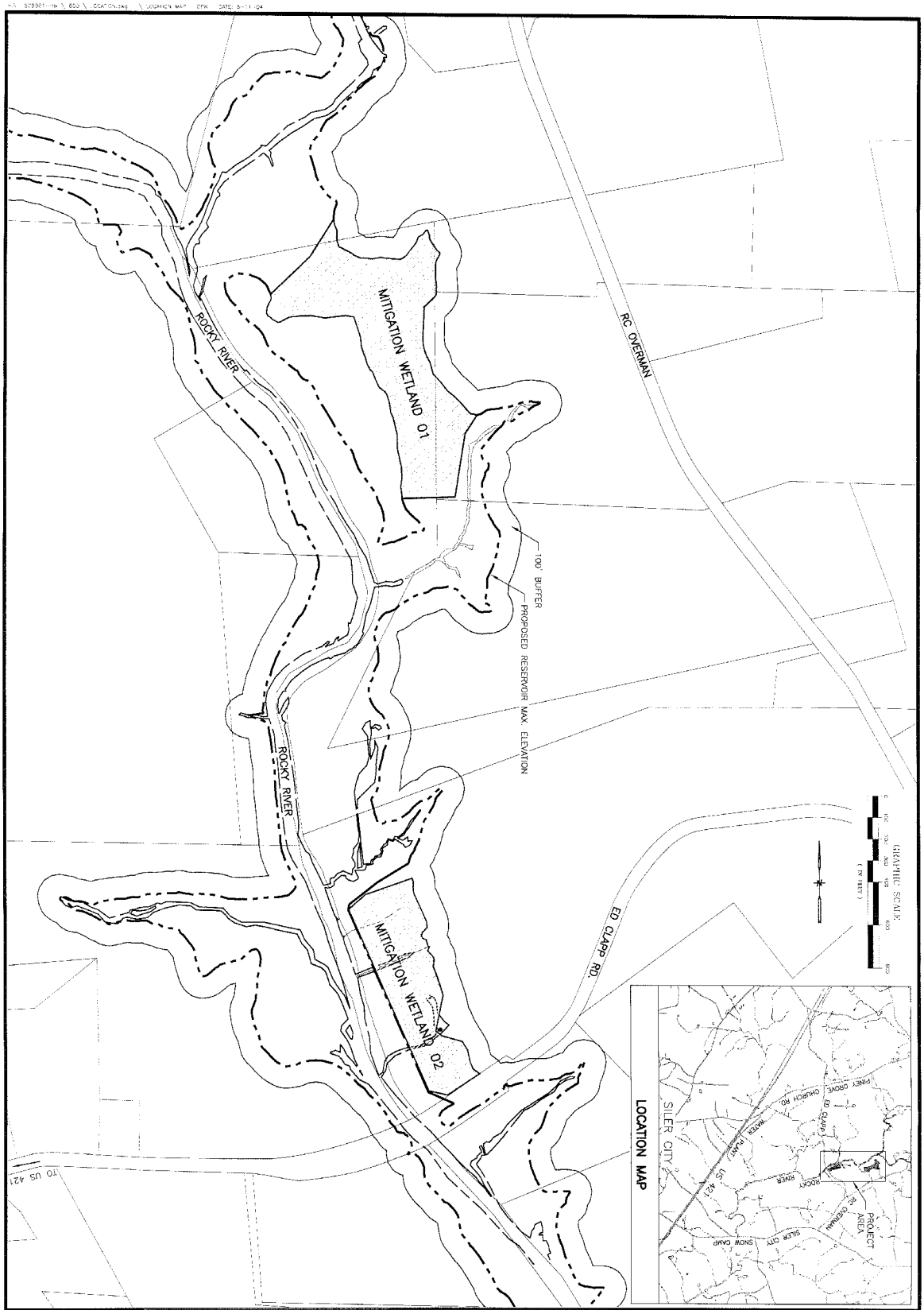
TABLE 5

PROPOSED ON-SITE WETLAND MITIGATION

Proposed Mitigation for Wetlands	Mitigation Acreage	Mitigation to Impact Ratio	Mitigation Credit Acreage
Wetland Creation Within MW-01 (Isolated Wetland Mitigation)	1.72	1:1	1.72
MW-01-Creation	8.82	3:1	2.94
MW-01-Restoration	1.89	1.5:1	1.26
MW-02-Creation	5.5	3:1	1.83
Fringe Wetland Creation	3.57	3:1	1.19
Buffer Area Wetland Preservation	0.15	10:1	0.02
Buffer Area Wetland Enhancement	0.16	4:1	0.04
Total	**21.81**		**9.00**

Mitigation Wetland 01 (MW-01)

MW-01 is a 10.71 acre site within the Rocky River Lower Reservoir project boundary consisting of 7.10 acres of upland and 3.64 acres of jurisdictional wetland. The general location of this site is shown in Figure 4 and its location within the project site is shown in Figure 5c. The existing wetlands are artifacts of human disturbance and will be flooded as a result of the proposed project. Within this wetland there is a stream channel that has been silted-in by human disturbances of the surrounding landscape. Siltation has caused the stream to severely braid and has destroyed the original channel. As part of the creation of MW-01, a new stream channel will be created; however, this is not included as part of the project's stream mitigation.



LOWER ROCKY RIVER
RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA

LOWER RESERVOIR LOCATION MAP OF
WETLAND MITIGATION
AREAS MW01 AND MW02

FIGURE NO. 4
SCALE: AS SHOWN
CHECKED: TGL
DRAWN: DFW
DESIGNED: BGL
DATE: MAY 2004

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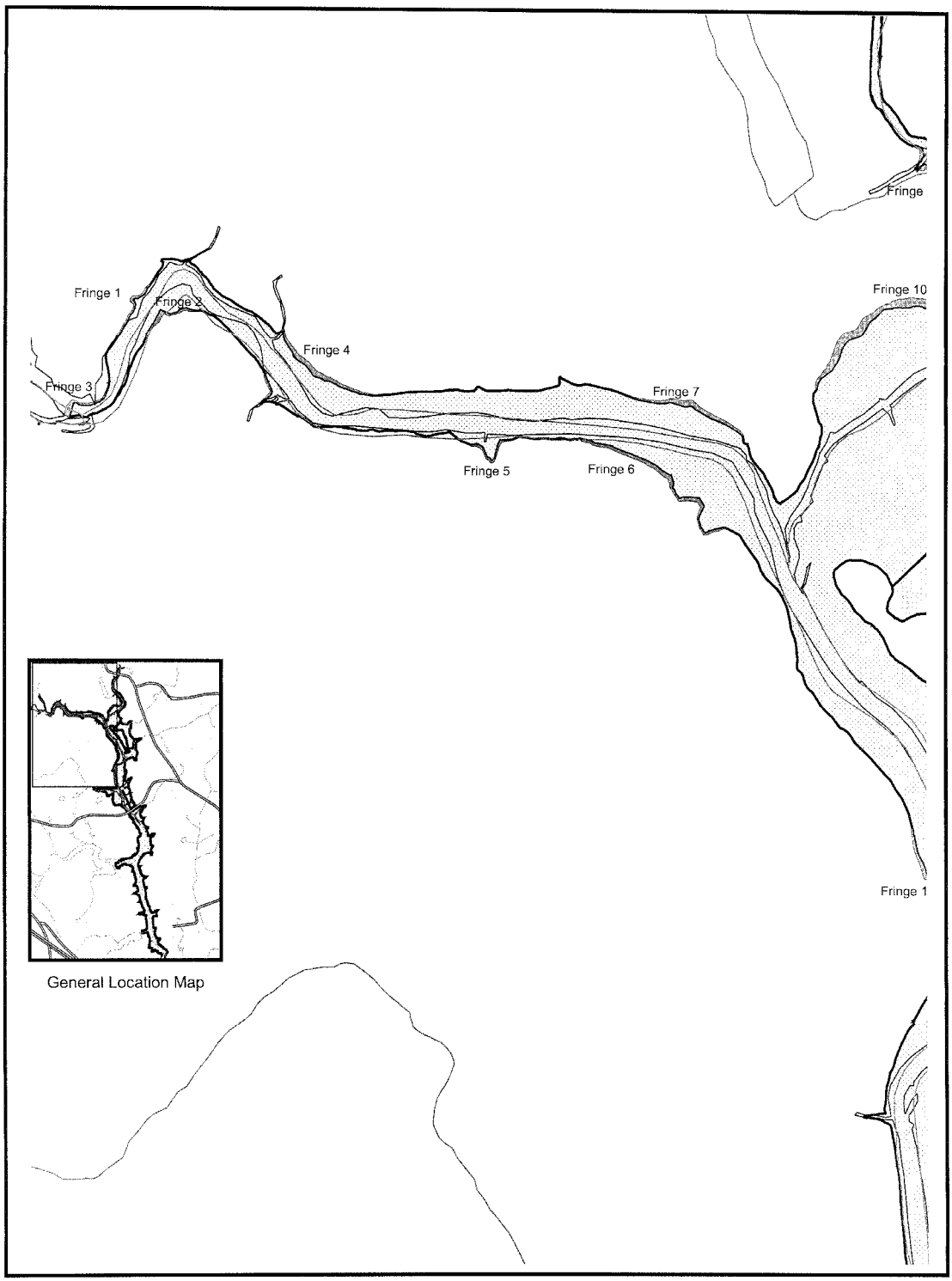
NAGS HEAD, NC – RALEIGH, NC
MYRTLE BEACH, SC – BEAUFORT, SC
300 S.W. Broad Street, Southern Pines, North Carolina 28387
Phone: (910) 692-5616 – Fax: (910) 692-4795

PRELIMINARY

REVISIONS

SYM.	DESCRIPTION	DATE	BY



LEGEND

- Streams
- Roads
- Rocky River
- Proposed Fringe Wetlands
- Mitigation Wetland 02
- Mitigation Wetland 01
- Proposed Reservoir

Location of On-Site Wetland Mitigation
Rocky River Lower Reservoir Expansion
Chatham County, North Carolina

200 0 200 400 Feet

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W E
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Figure 5A

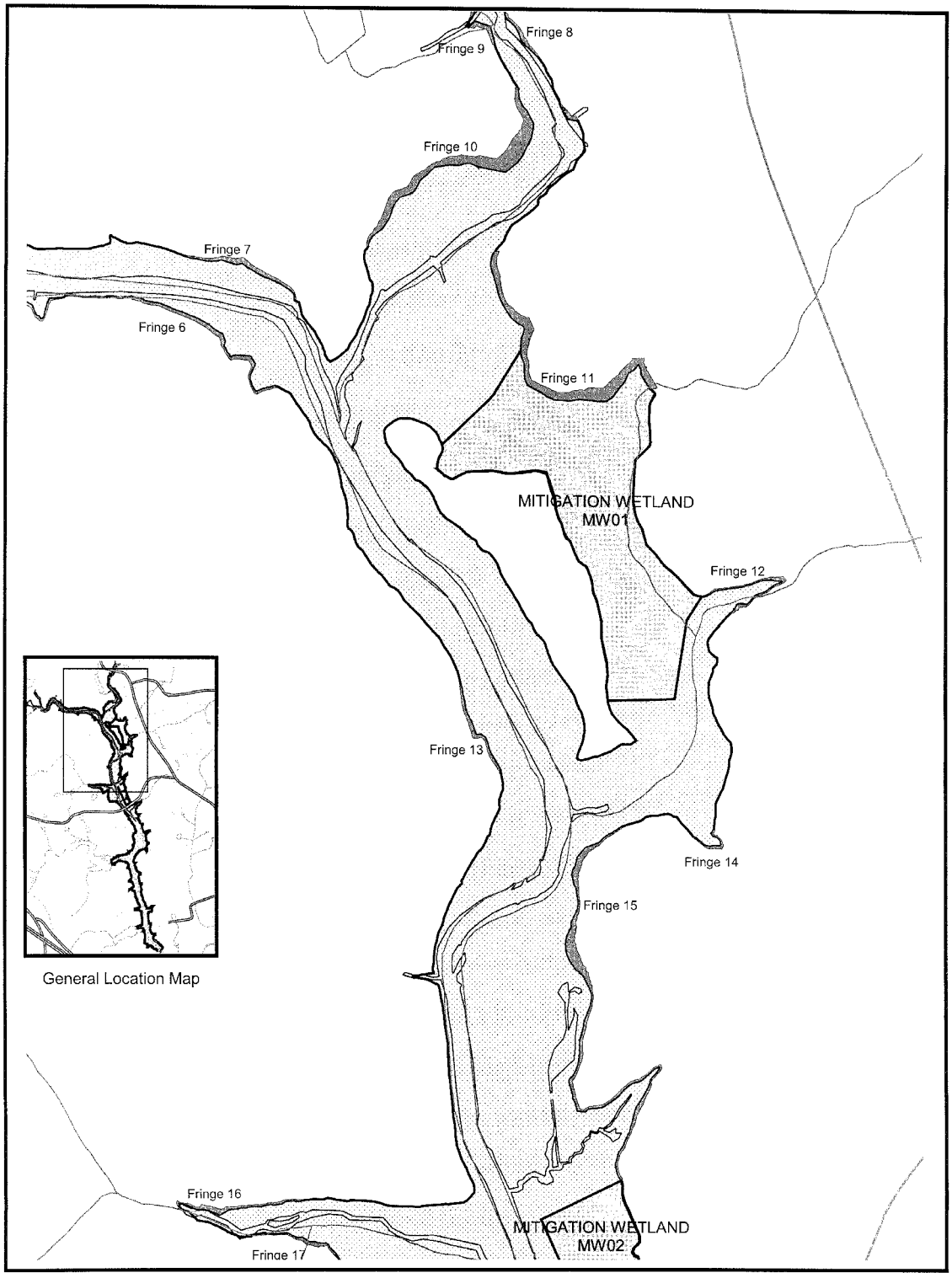
Fringe 8
Fringe 9
Fringe 10
Fringe 7
Fringe 6
Fringe 11
MITIGATION WETLAND
MW01
Fringe 12
Fringe 13
Fringe 14
Fringe 15
Fringe 16
Fringe 17
MITIGATION WETLAND
MW02
General Location Map
LEGEND
Streams
Roads
Rocky River
Proposed Fringe Wetlands
Mitigation Wetland 02
Mitigation Wetland 01
Proposed Reservoir
Location of On-Site Wetland Mitigation
Rocky River Lower Reservoir Expansion
Chatham County, North Carolina
200 0 200 400 Feet
N
W
E
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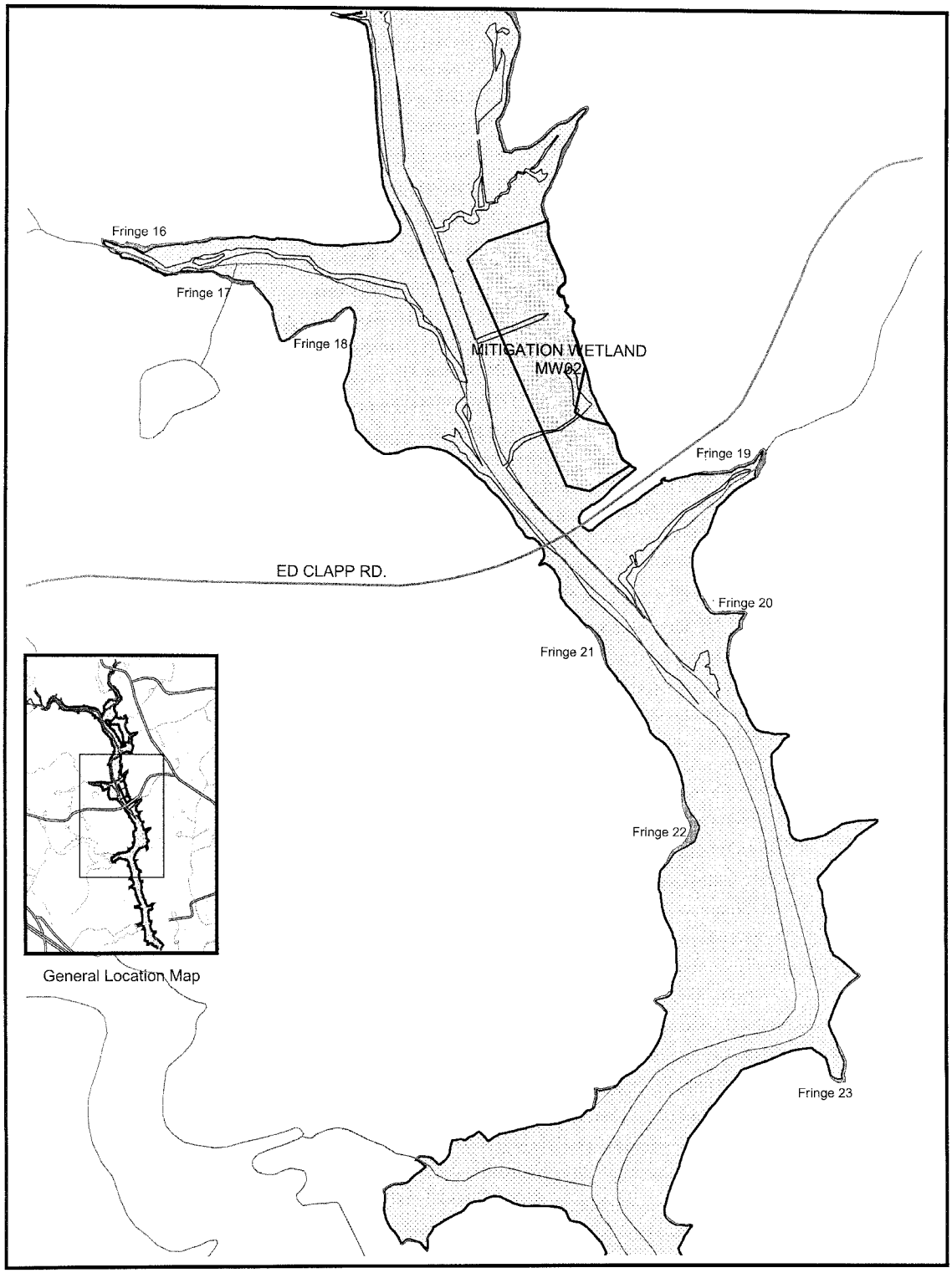
Figure 5B



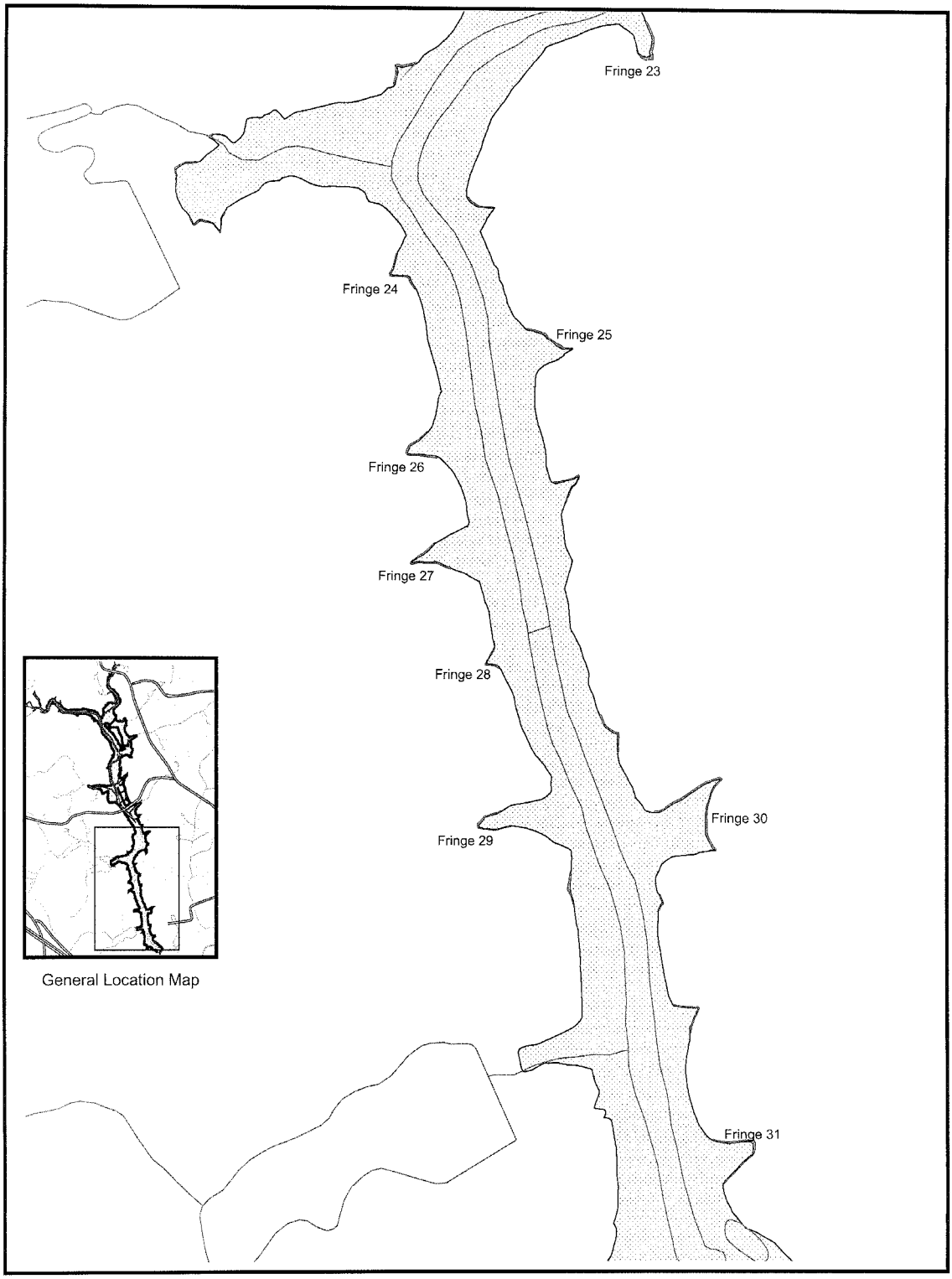
LEGEND
Streams
Roads
Rocky River
Proposed Fringe Wetlands
Mitigation Wetland 02
Mitigation Wetland 01
Proposed Reservoir

Location of On-Site Wetland Mitigation
Rocky River Lower Reservoir Expansion
Chatham County, North Carolina

200 0 200 400 Feet

N
W E
S

Figure 5C



LEGEND
Streams
Roads
Rocky River
Proposed Fringe Wetlands
Mitigation Wetland 02
Mitigation Wetland 01
Proposed Reservoir

Location of On-Site Wetland Mitigation
Rocky River Lower Reservoir Expansion
Chatham County, North Carolina

200 0 200 400 Feet

N
W E
S

Figure 5D

The majority of MW-01 has been clear-cut with small areas being used as pasture. The elevation ranges from 538 to 542 MSL. It is bordered to the north by pasture, to the west by alluvial forest, agricultural land and the Rocky River, the east by thinned and unthinned upland hardwood forest and to the south by clear-cut, upland hardwood forest and pasture. Figure 6 depicts the existing conditions at MW-01 and Figure 7 shows the existing land use and topography at this site.

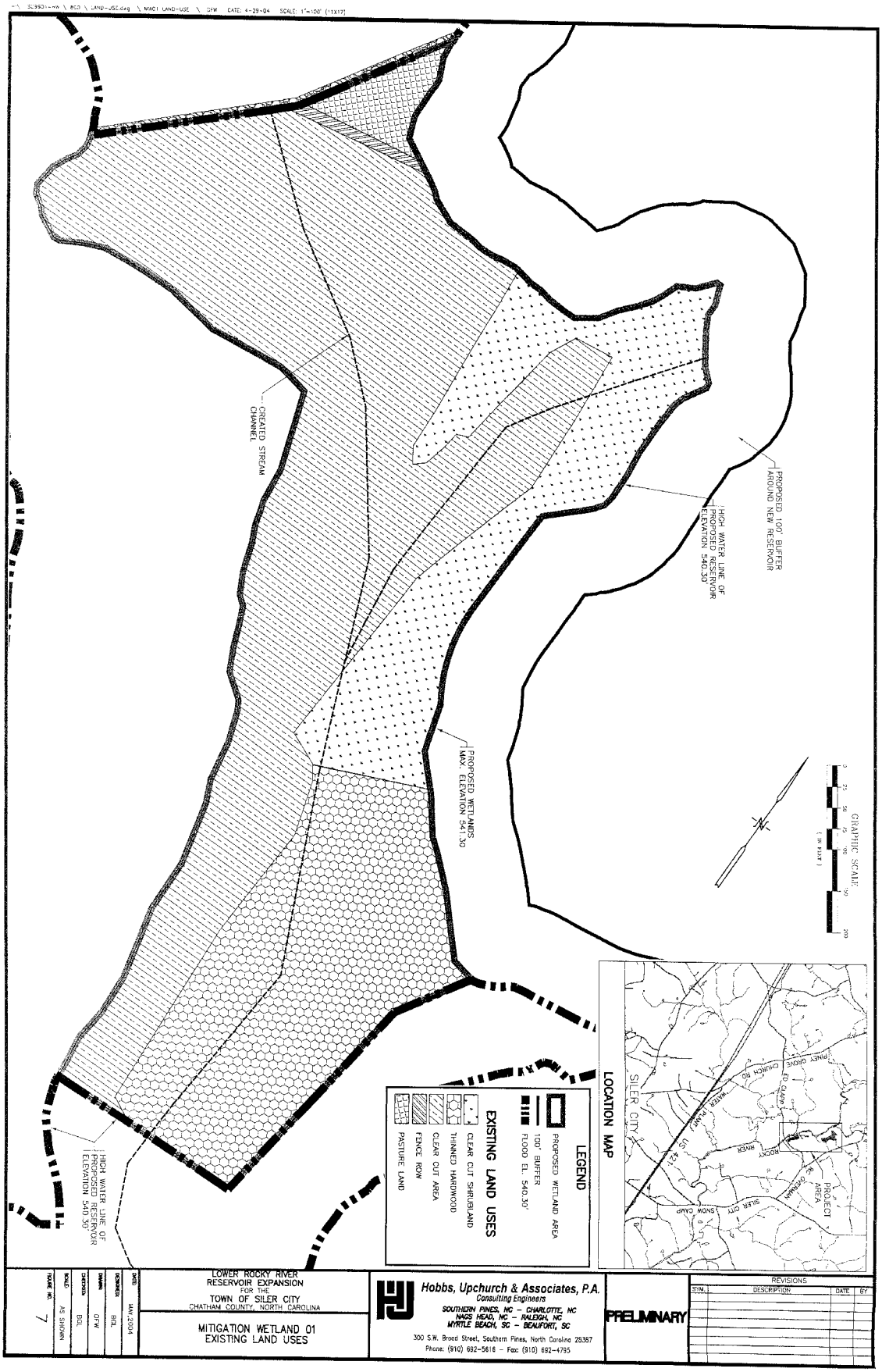
Figure 6: Photo of existing conditions at Mitigation Wetland 01, Chatham County, North Carolina.

Soils at MW-01 are mapped as Nanford, Badin, Chewacla, Wehadkee, Peawick, and Georgeville series (Figure 8) (USDAa, unpublished). Historically, the predominant plant community on the site was Piedmont Alluvial Forest. Figure 9 shows the existing vegetative communities at this site.

The proposed mitigation will fill 10.71 acres within the reservoir boundary. The fill material will be obtained from adjacent areas within the proposed reservoir boundary and existing wetland soils will be stockpiled for use as topsoil (Figure 10). Final elevations within the mitigation site will range between 540.6 and 541.3 feet above MSL, with a maximum elevation of 1 foot above the proposed reservoir's normal pool (540.3 MSL).

The hydrology for MW-01 will come from several sources. First, the reservoir pool will be hydrologically connected to the northwestern and southeastern portions of the mitigation site (Figure 4). Additionally, a new channel will be created that runs the length of mitigation site from north to south (Figure 7). This channel will have a near zero grade and will be a conveyance that is filled with water at the reservoir pool level. Due to the lack of grade, there will be no stream channel design and no mitigation credit will be involved. In addition, the braided stream channel that enters the mitigation site from the northeast will be restored to the point where it connects with the created channel mentioned above (Figure 7). No mitigation credit will be involved with the stream channel restoration. Site specific grading plans are shown in Figure 11.

The mitigation area will be planted with native wetland plants. The target vegetative community will be Piedmont Alluvial Forest with areas of Floodplain Pool and emergent wetland. The forest community will be created by planting hydrophytic species such as river


CREATED STREAM CHANNEL
PROPOSED WETLANDS MAX. ELEVATION 541.30
HIGH WATER LINE OF PROPOSED RESERVOIR ELEVATION 540.30'
PROPOSED 100' BUFFER AROUND NEW RESERVOIR
HIGH WATER LINE OF PROPOSED RESERVOIR ELEVATION 540.30'
GRAPHIC SCALE
LOCATION MAP
SILER CITY
US 421
PROJECT AREA
LEGEND
PROPOSED WETLAND AREA
100' BUFFER FLOOD EL. 540.30'
EXISTING LAND USES
CLEAR CUT SHRUBLAND
THINNED HARDWOOD
CLEAR CUT AREA
FENCE ROW
PASTURE LAND
LOWER ROCKY RIVER RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA
MITIGATION WETLAND 01
EXISTING LAND USES
Hobbs, Upchurch & Associates, P.A.
Consulting Engineers
SOUTHERN PINES, NC – CHARLOTTE, NC
NAGS HEAD, NC – RALEIGH, NC
MYRTLE BEACH, SC – BEAUFORT, SC
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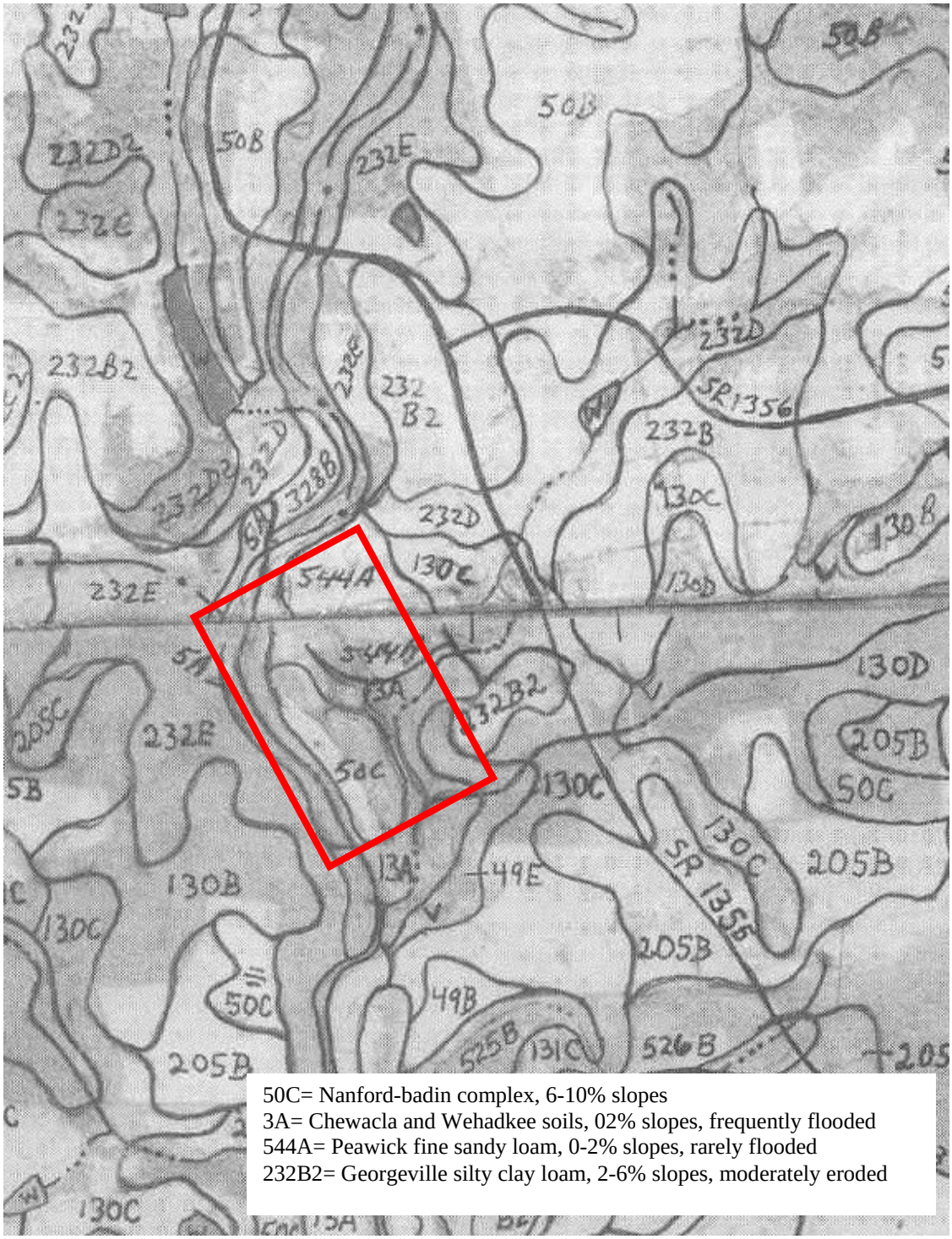
PRELIMINARY
REVISIONS
NUM. DESCRIPTION DATE BY
DATE: MAY 2004
SCANNED: BTCL
DRAWN: DFW
CHECKED: BDL
SCALE: AS SHOWN
TRACK NO. 7

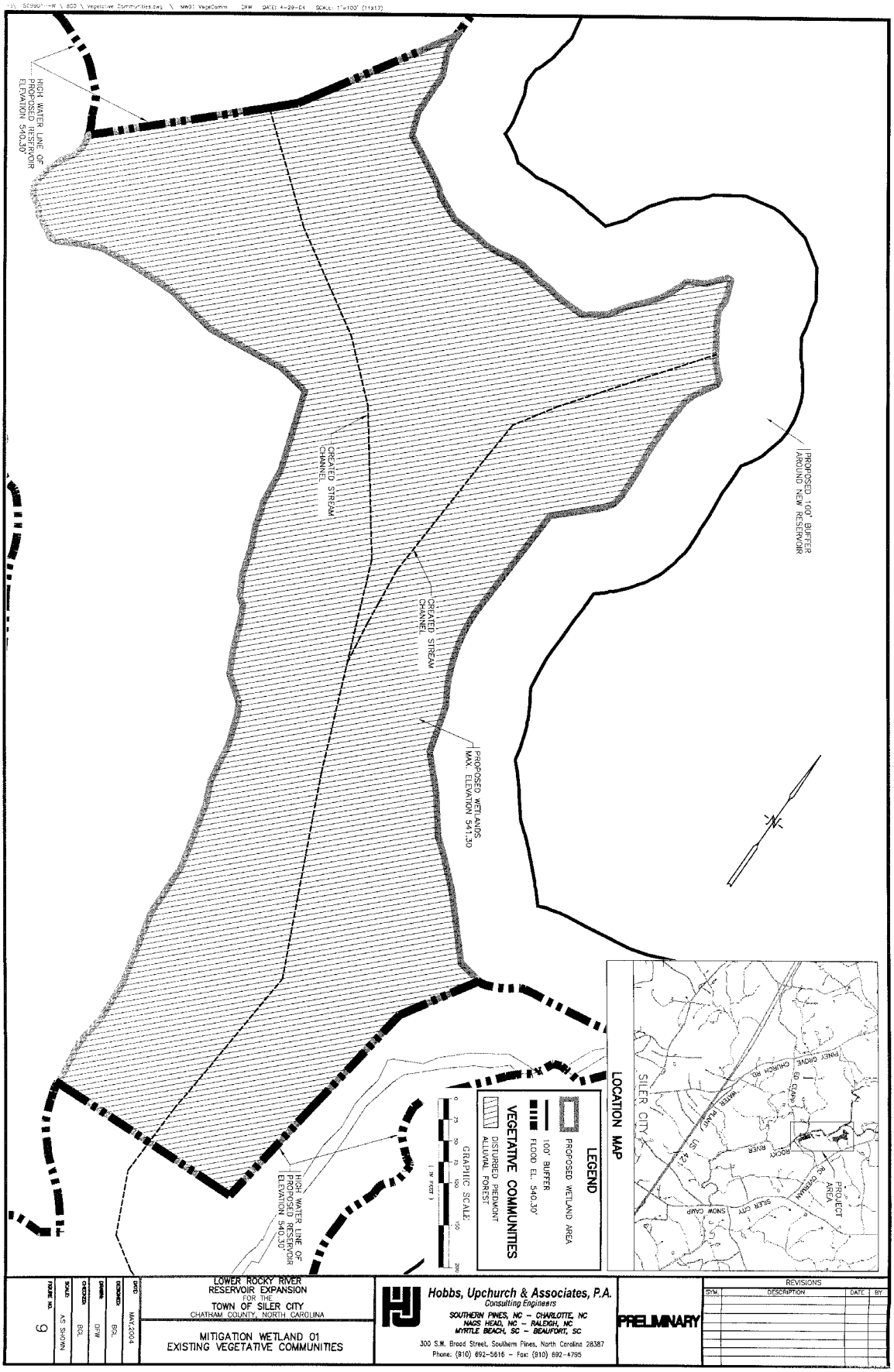


50C= Nanford-badin complex, 6-10% slopes
3A= Chewacla and Wehadkee soils, 02% slopes, frequently flooded
544A= Peawick fine sandy loam, 0-2% slopes, rarely flooded
232B2= Georgeville silty clay loam, 2-6% slopes, moderately eroded

FIGURE 8

MITIGATION WETLAND 01: SOIL MAP UNITS
ROCKY RIVER LOWER RESERVOIR EXPANSION
CHATHAM COUNTY, NORTH CAROLINA

Prepared By:
Dr. J.H. Carter, III & Associates
Southern Pines, North Carolina


HIGH WATER LINE OF PROPOSED RESERVOIR ELEVATION 540.30
CREATED STREAM CHANNEL
CREATED STREAM CHANNEL
PROPOSED 100' BUFFER AROUND NEW RESERVOIR
PROPOSED WETLANDS MAX. ELEVATION 541.30
HIGH WATER LINE OF PROPOSED RESERVOIR ELEVATION 540.30
LOCATION MAP
SILER CITY
US 421
PROJECT AREA
LEGEND
PROPOSED WETLAND AREA
100' BUFFER
FLOOD EL. 540.30'
VEGETATIVE COMMUNITIES
DISTURBED PIEDMONT
ALLUVIAL FOREST
GRAPHIC SCALE
(IN FEET)
LOWER ROCKY RIVER RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA
MITIGATION WETLAND 01
EXISTING VEGETATIVE COMMUNITIES
Hobbs, Upchurch & Associates, P.A.
Consulting Engineers
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SYM. DESCRIPTION DATE BY
FIGURE NO. 9
SCALE: AS SHOWN
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ENGINEER: BCL
DATE: MAY,2004

PROPOSED CONTOURS
PROPOSED BORROW AREA
CLASS I RIPRAP AT EDGE OF RESERVOIR 10'WIDE X 2' DEEP FOR 460 LF OF SHORE
SUPPLEMENTAL FILL AREAS TYPICAL
EXISTING CONTOURS
HIGH WATER LINE OF PROPOSED RESERVOIR ELEVATION 540.30'
PROPOSED WETLANDS MAX. ELEVATION 541.30'
CREATED STREAM CHANNELS
EXISTING WETLAND AREAS TO BE RESTORED, TYP.
PROPOSED 100' BUFFER AROUND NEW RESERVOIR
GRAPHIC SCALE
LOCATION MAP
SILER CITY
PROJECT AREA
LEGEND
TOTAL CREATED WETLANDS: 10.7 ACRES
TOTAL IMPACTED WETLANDS: 1.5 ACRES
TOTAL CUT: 1683 YARDS
TOTAL FILL: 48587 YARDS
PROPOSED MITIGATION WETLAND AREA 01
EXISTING WETLANDS
100' BUFFER
FLOOD EL. 540.30'
PROPOSED 5' CONTOUR
PROPOSED 1' CONTOUR
EXISTING 5' CONTOUR
EXISTING 1' CONTOUR
LOWER ROCKY RIVER RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA
MITIGATION WETLAND 01
GRADING PLAN
Hobbs, Upchurch & Associates, P.A.
Consulting Engineers
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MOSS HEAD, NC – RALEIGH, NC
MYRTLE BEACH, SC – BEAUFORT, SC
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PRELIMINARY
REVISIONS
SYM. DESCRIPTION DATE BY
DRAWING NO. 10
SCALE: AS SHOWN
CHECKED: BGL
DRAWN: DFW
DESIGNED: BGL
DATE: MAY 2004

LOWER ROCKY RIVER
RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA

MITIGATION WETLAND
BORROW AREAS #1 AND #2

Hobbs, Upchurch & Associates, P.A.
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NAGS HEAD, NC – RALEIGH, NC
MYRTLE BEACH, SC – BEAUFORT, SC
300 S.W. Broad Street, Southern Pines, North Carolina 28387
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PRELIMINARY

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SYM.	DESCRIPTION	DATE	BY

DATE:	MAY/2004
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SCALE:	AS SHOWN
FIGURE NO.	11

birch, sycamore, hackberry, sweetgum, green ash and tulip poplar. Herbaceous species such as soft rush (*Juncus effusus*), woolgrass (*Scirpus cyperinus*) and sedges (*Carex* spp.) will be allowed to colonize in the pool and marsh communities. The saplings will be planted using 10x10 foot spacing (or less) with at least 435 individuals per acre. The saplings will be fertilized in their first and second years.

Mitigation Wetland 02 (MW-02)

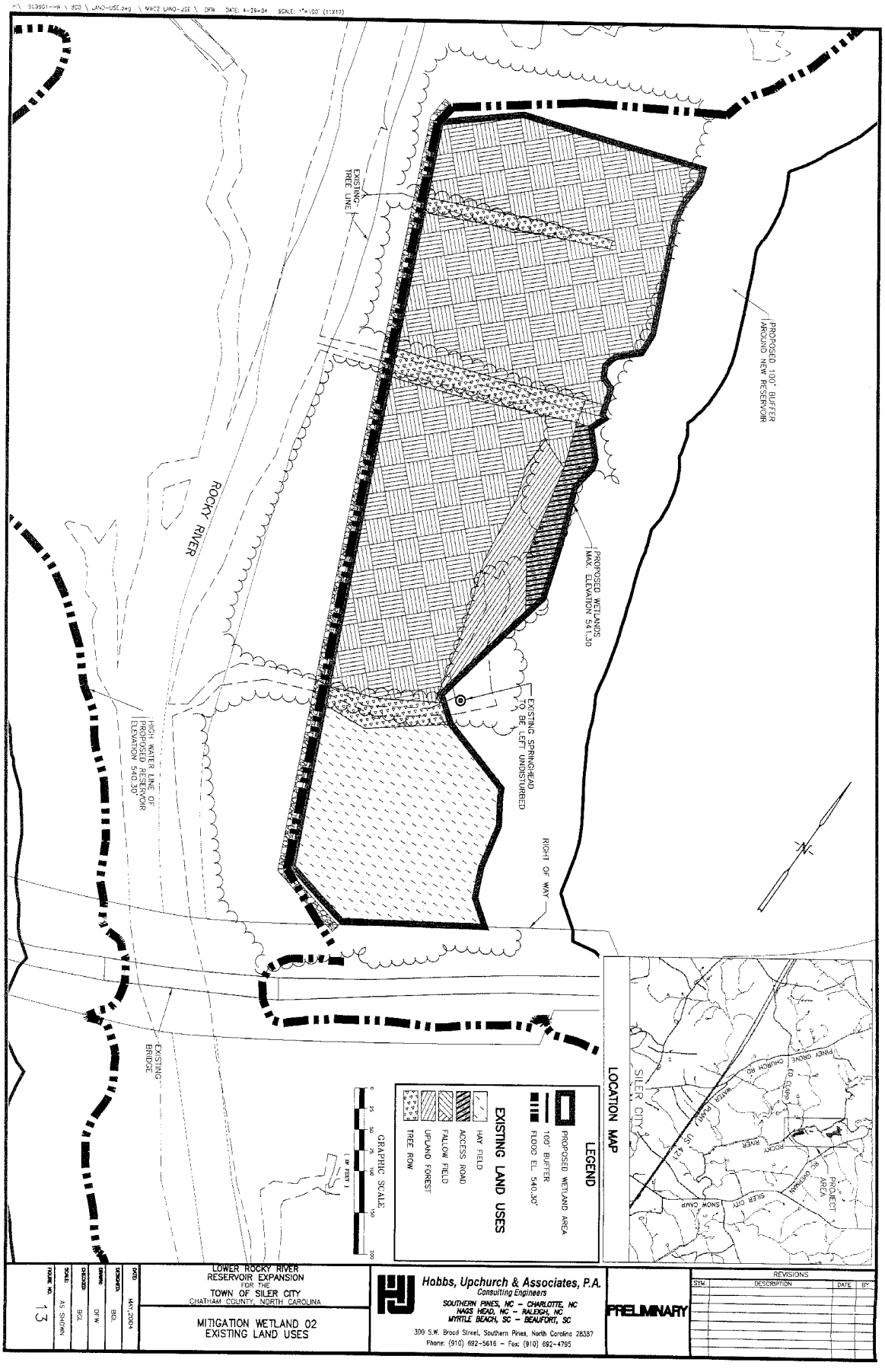
Figure 12: Photo of existing conditions at Mitigation Wetland 02, Chatham County, North Carolina.

The proposed wetland mitigation site MW-02 totals 5.50 acres consisting of 5.40 acres of current upland and approximately 0.10 acres of wetland within the Rocky River Lower Reservoir project boundary. The general location of this site is shown in Figure 4 and its location within the project site is shown in Figure 5c. The site will be flooded as a result of the proposed project. The site is currently being used as agricultural land with narrow strips of hardwood trees along 3 drainage ditches (Figure 12).

Elevation ranges from 536 to 542 MSL. It is bordered to the north by agricultural land, to the east by upland hardwood forest and pasture, to the west by agricultural land and the Rocky River, and to the south by a hayfield. Figure 13 shows the existing land use and topography at this site.

Soils on the site are mapped as the Wickham, Wahee and Georgeville series (Figure 14) (USDAa, unpublished). Historically, the predominant plant community on the site was probably Mesic Oak-Hickory Forest . The mitigation site has been significantly altered from its historical community type by conversion to agricultural land. Figure 15 depicts the existing vegetative communities at MW-02.

The proposed mitigation will fill 5.5 acres within the reservoir boundary. The fill material will be obtained from adjacent areas within the proposed reservoir (Figure 16). Final elevations within the mitigation site will vary between 540.6 and 541.3 feet above MSL, with a maximum elevation of 1 foot above the proposed reservoir's normal pool (540.3 MSL). Hydrology will be provided by adjacent waters of the proposed reservoir and an area of existing hillside groundwater discharge. Ditches on the site will be blocked with impervious clay plugs (Figure 17). Site specific grading plans are provided in Figure 18.


EXISTING TREE LINE
PROPOSED 100' BUFFER AROUND NEW RESERVOIR
ROCKY RIVER
PROPOSED WETLANDS MAX. ELEVATION 541.30
EXISTING SPRINGHEAD TO BE LEFT UNDISTURBED
HIGH WATER LINE OF PROPOSED RESERVOIR ELEVATION 540.30'
RIGHT OF WAY
EXISTING BRIDGE
N
LOCATION MAP
SILER CITY
PROJECT AREA
LEGEND
PROPOSED WETLAND AREA
100' BUFFER
FLOOD EL. 540.30'
EXISTING LAND USES
HAY FIELD
ACCESS ROAD
FALLOW FIELD
UPLAND FOREST
TREE ROW
GRAPHIC SCALE
0 35 50 75 100 150 200
(IN FEET)
LOWER ROCKY RIVER
RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA
MITIGATION WETLAND 02
EXISTING LAND USES
Habbs, Upchurch & Associates, P.A.
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MYRTLE BEACH, SC – BEAUFORT, SC
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DATE: MAY, 2004
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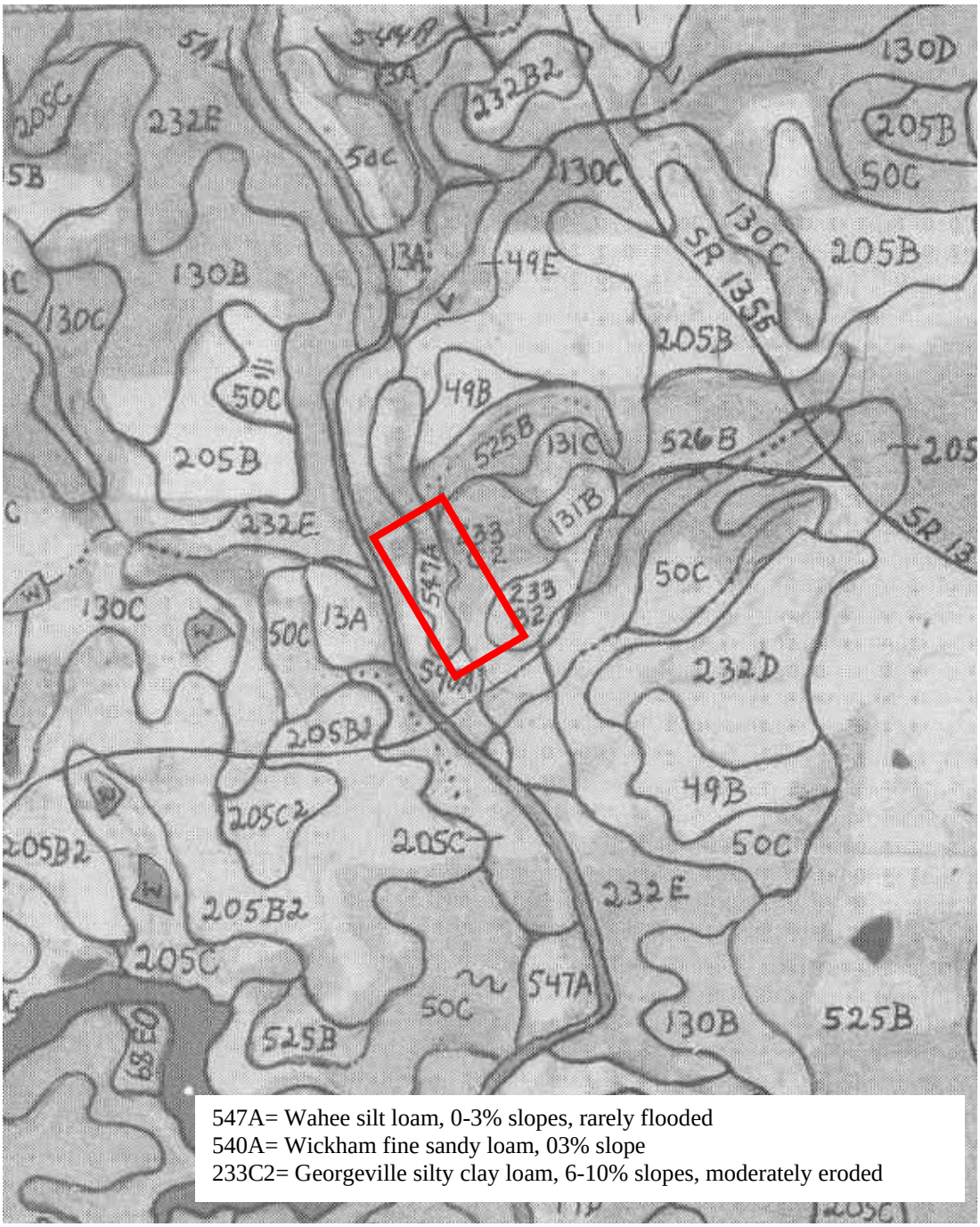
CHECKED: BGL
SCALE: AS SHOWN
FRAME NO. 13



547A= Wahee silt loam, 0-3% slopes, rarely flooded
540A= Wickham fine sandy loam, 03% slope
233C2= Georgeville silty clay loam, 6-10% slopes, moderately eroded

January 12, 2004

FIGURE 14

MITIGATION WETLAND 02: SOIL MAP UNITS
ROCKY RIVER LOWER RESERVOIR EXPANSION
CHATHAM COUNTY, NORTH CAROLINA

Prepared By:
Dr. J.H. Carter, III & Associates
Southern Pines, North Carolina

Site location

Scale 1:2000

LOWER ROCKY RIVER
RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA

MITIGATION WETLAND 02
EXISTING VEGETATIVE COMMUNITIES

Hobbs, Upchurch & Associates, P.A.
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PRELIMINARY

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SYM	DESCRIPTION	DATE	BY

DATE:	MAY, 2004
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CHECKED:	BGL
SCALE:	AS SHOWN
FIGURE NO.	15

BORROW AREA #3
ROCKY RIVER
BORROW AREA #3
PROPOSED CONTOURS
GRAPHIC SCALE
BORROW AREA #4
ROCKY RIVER
ED CLAPP RD.
BORROW AREA #4
PROPOSED CONTOURS
MITIGATION WETLAND 02
BORROW AREAS LOCATION MAP
ED CLAPP RD.
BORROW AREA #4
MITIGATION WETLAND 02
BORROW AREA #3
BORROW AREA #2
MITIGATION WETLAND 01
BORROW AREA #1
LOWER ROCKY RIVER RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA
MITIGATION WETLAND
BORROW AREAS #3 AND #4
Hobbs, Upchurch & Associates, P.A.
Consulting Engineers
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NAGS HEAD, NC – RALEIGH, NC
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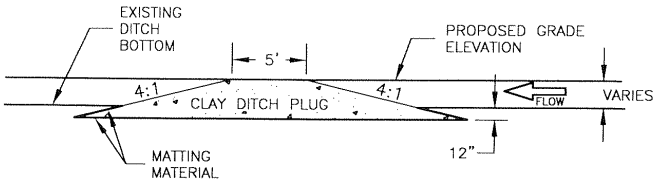
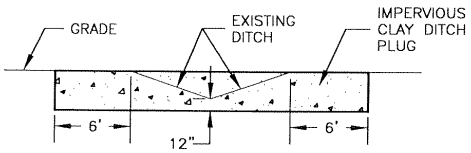
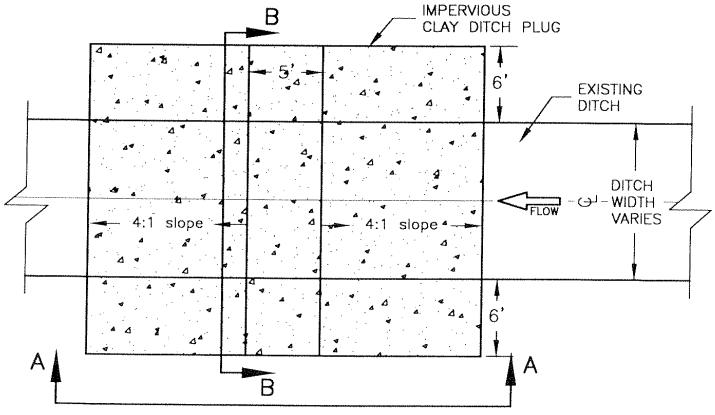
PRELIMINARY
REVISIONS
SYM
DESCRIPTION
DATE
BY
DESIGNED: BGL
DRAWN: DFW
CHECKED: BGL
SCALE: AS SHOWN
DATE: MAY 2004
TASK NO. 16



SECTION A–A
NTS



SECTION B–B
NTS



PLAN VIEW OF EXISTING DITCH
WITH IMPERVIOUS CLAY DITCH PLUG
NTS

REVISIONS

SYM.	DESCRIPTION	DATE	BY

PRELIMINARY

Hobbs, Upchurch & Associates, P.A.
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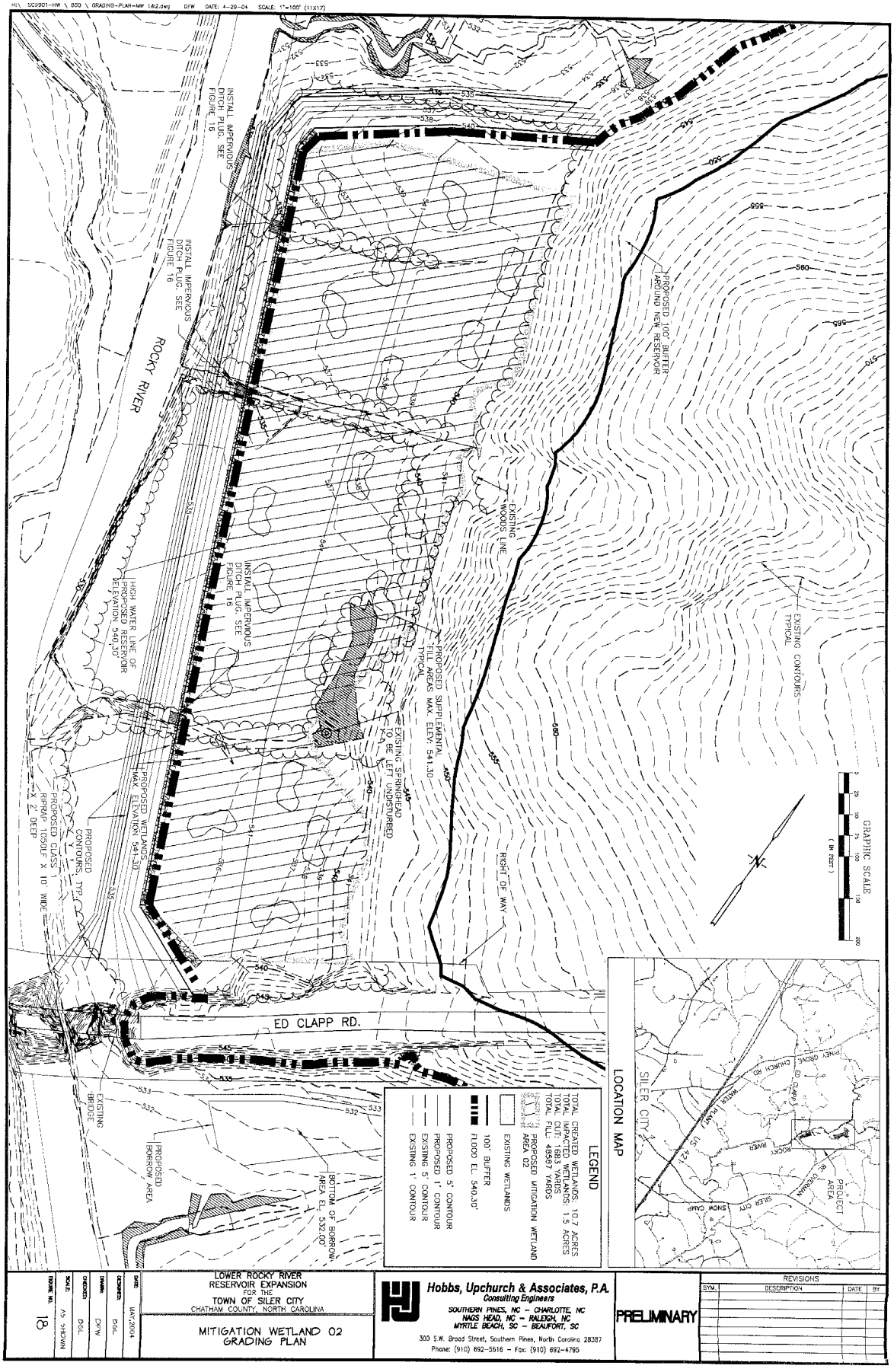
LOWER ROCKY RIVER
RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA

TYPICAL CROSS SECTION
IMPERVIOUS DITCH PLUG

DATE:	MAY, 2004
DESIGNED:	BGL
DRAWN:	DFW
CHECKED:	BGL
SCALE:	AS SHOWN
FIGURE NO.	17

\ WWDETAILS DFW DATE: 4-29-04 SCALE: 1"=100' (11X17)


H:\ SIGNED\-HW \ 800 \ GRADING-PLAN-MW 1&2.dwg DFW DATE: 4-29-04 SCALE: 1"=100' (11X17)
ROCKY RIVER
INSTALL IMPERVIOUS DITCH PLUG. SEE FIGURE 16
INSTALL IMPERVIOUS DITCH PLUG. SEE FIGURE 16
INSTALL IMPERVIOUS DITCH PLUG. SEE FIGURE 16
HIGH WATER LINE OF PROPOSED RESERVOIR ELEVATION 540.30'
PROPOSED WETLANDS MAX. ELEVATION 541.30
PROPOSED CONTOURS TYP.
PROPOSED CLASS 1 RIPRAP 105OLF X 10' WIDE X 2' DEEP
PROPOSED SUPPLEMENTAL TYP. AREAS MAX. ELEV. 541.30
EXISTING STUMPHEAD TO BE LEFT UNDISTURBED
EXISTING WOODS LINE
PROPOSED 100' BUFFER AROUND NEW RESERVOIR
EXISTING CONTOURS TYPICAL
RIGHT OF WAY
ED CLAPP RD.
EXISTING BRIDGE
PROPOSED BORROW AREA
BOTTOM OF BORROW AREA EL. 532.00'
LEGEND
TOTAL CREATED WETLANDS: 10.7 ACRES
TOTAL IMPACTED WETLANDS: 1.5 ACRES
TOTAL CUT: 18837 YARDS
TOTAL FILL: 48587 YARDS
PROPOSED MITIGATION WETLAND AREA 02
EXISTING WETLANDS
100' BUFFER
FLOOD EL. 540.30'
PROPOSED 5' CONTOUR
PROPOSED 1' CONTOUR
EXISTING 5' CONTOUR
EXISTING 1' CONTOUR
LOCATION MAP
SILER CITY
US 421
ROCKY RIVER
SNOW CAMP
PROJECT AREA
GRAPHIC SCALE
(IN FEET)
LOWER ROCKY RIVER RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA
MITIGATION WETLAND 02 GRADING PLAN
Hobbs, Upchurch & Associates, P.A.
Consulting Engineers
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PRELIMINARY
REVISIONS
SYM. DESCRIPTION DATE BY
PROJECT NO. 18
SCALE AS SHOWN
CHECKED DSL
DRAWN DFW
DESIGNED DSL
DATE MAY 2004

The mitigation area will be planted with native wetland plants. The target vegetative community will be Piedmont Alluvial Forest with areas of Floodplain Pool and emergent wetland. The forest community will be created by planting hydrophytic species such as river birch, sycamore, hackberry, sweetgum, green ash and tulip poplar. Herbaceous species such as soft rush (*Juncus effusus*), woolgrass (*Scirpus cyperinus*) and sedges (*Carex spp*.) will be allowed to colonize in the pool and marsh communities. The saplings will be planted using 10x10 foot spacing (or less) with at least 435 individuals per acre. The saplings will be fertilized in their first and second years.

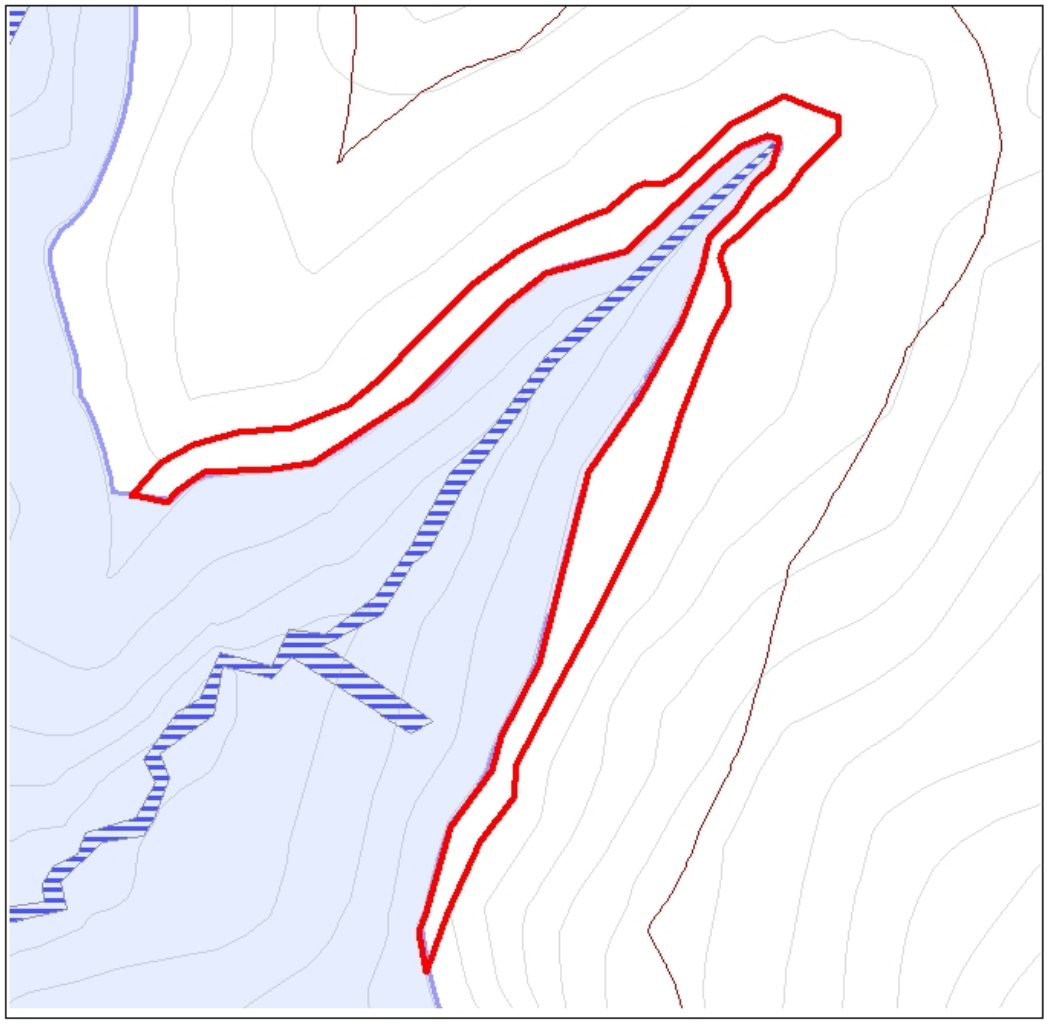
Fringe Wetland

Many of the wetlands to be impacted by the proposed project are narrow fringe wetlands around the existing reservoir. Fringe wetlands protect water quality, protect and stabilize shorelines and provide habitat for fish and wildlife. Based on topography and landscape position, it is anticipated that wetland fringe will naturally form around portions of the new reservoir just as they have formed around the existing reservoir. An example of the typical wetland fringe location is shown in Figure 19. In general, the following parameters were used to determine the locations of wetland fringe around the proposed reservoir.

- Slope must be gentle to moderate (ranging from 0-8%);
- landscape position must be conducive to wetland development, such as coves and flat areas

Fringe wetland areas that are not forested prior to the creation of the reservoir will be planted with native wetland plant species, such as river birch, sycamore, hackberry, sweetgum, green ash and tulip poplar. Herbaceous species such as soft rush (*Juncus effusus*), woolgrass (Scirpus cyperinus) and sedges (*Carex spp*.) will be allowed to colonize fringe wtlands. The saplings will be planted using 10x10 foot spacing (or less) with at least 435 individuals per acre. The saplings will be fertilized in their first and second years. JCA and HUA are working to stake the location of each fringe wetland so they will not be impacted during construction and so the success of wetland establishment can be documented.

Thirty-two natural wetland fringe areas ranging between .02 and .70 acre are anticipated to form as a result of this project totaling approximately 3.57 acres. Figures 4a through 4d show the locations of these wetlands.



Fringe wetland formation will occur in areas with the following features:
1) Gentle slopes
2) Coves

Figure 19: An example of a typical wetland fringe location, proposed Rocky River Lower Reservoir expansion project, Chatham County, North Carolina.

Wetland Enhancement

A wetland complex consisting of 0.16 acre of nonforested, prior-converted wetland along Mud Lick Creek will be enhanced. Natural vegetation composition will be enhanced on these wetlands by replanting hydrophytic species such as river birch, green ash and tulip poplar at a minimum of 435 trees per acre. The location of this wetland complex is shown in Figure 5a.

Wetland Preservation

Existing forested wetlands within the proposed 100-foot buffer, totaling 0.15 acre, will be preserved in perpetuity. The locations of these wetlands are shown in Figures 4a through 4d**.**

Off-Site Wetland Mitigation

The Town is negotiating the acquisition of a wetland along the headwaters of the Rocky River for wetland preservation and enhancement. This stretch of the Rocky River is listed on the state's 303d list of impaired waterbodies due to agricultural uses associated with pasture grazing in adjacent riparian and/or upland areas (NCDWQ 2003). Wetland preservation and enhancement along this part of the Rocky River may help to improve water quality. Table 6 lists the proposed off-site wetland mitigation activities. A detailed discussion of these activities follows.

TABLE 6

Proposed Off-Site Wetland Mitigation

Proposed Mitigation Activity for Wetlands	Mitigation Acreage	Mitigation to Impact Ratio	Mitigation Credit Acreage
Wetland Enhancement- Parcel No. 8735049459	3.23	4:1	0.81
Wetland Preservation-- Parcel No. 8735049459	0.30	10:1	0.03
Total	**3.53**		**0.84**

Enhancement and Preservation of Parcel No. 8735049459

The wetland enhancement and preservation on Parcel No. 8735049459 consists of 3.53 acres located 2 miles south of Liberty in Randolph County (Figure 20). The site is located at the intersection of U.S. Highway 421 and State

Figure 20: Photo of Existing Conditions at Parcel No. 8735049459, Randolph County, North Carolina

Route 49 along the Rocky River near the Chatham-Randolph County line, North Carolina (Figure 21). It is bordered to the north by open wetland, to the south by pasture, to the east by hardwood forest and to the west by U.S. Highway 421.

Soils on the mitigation site are mapped as the Wehadkee and Vance series (Figure 22) (USDA(a) unpublished). Historically, plant communities on the site probably included Mesic Mixed Hardwood Forest and Piedmont Alluvial Forest. These communities have been altered by fire and beaver (*Caster canadensis*) activity allowing exotic plant species to invade. As shown in Figure 20, this site is currently dominated by hydrophytic herbaceous vegetation including vermin grass, Japanese honeysuckle (*Lonicera japonica*), tearthumb (*Polygonum sagittatum*), soft rush, blackberry (*Rubus sp.),* black willow and sweetgum saplings. Remnants of the native community types exist along the edges of the wetland. Figure 23 shows the existing vegetative communities on the property.

On 27 April 2004, the USACOE verified the wetland delineation on Parcel No. 8735049459. Of the 3.53 acres of wetland, 3.23 acres are non-forested and will be enhanced by planting river birch, black willow, green ash and tulip poplar (a minimum of 435 trees per acre). All 3.53 acres will be preserved in perpetuity by donation to a land trust or similar conservation organization.

MONITORING ACTIVITIES

Reference Forest Ecosystems

A reference forest ecosystem (RFE) has been located for the fringe wetland areas and MW-01 and MW-02. The site is located on Fox Lake adjacent to the Rocky River Lower Reservoir and is owned by the Town (Figure 24). The vegetative community on this site is Piedmont Alluvial Forest. JCA is in the process of characterizing the RFE and installing vegetation monitoring plots and groundwater monitoring wells.

Wetland Mitigation Sites

Wetland mitigation sites will be monitored for a period of 5 years or until the success criteria have been met, whichever is longer. Within MW-01 and MW-02, monitoring wells will be placed in the areas of highest elevation on the site to ensure hydrologic success criteria are being met throughout the site. As shown in Figures 25 and 26, 5 monitoring wells will be placed in MW-01 and 4 monitoring wells will be placed in MW-02. Electronic monitoring wells will record water levels daily and be downloaded every 3-4 months.

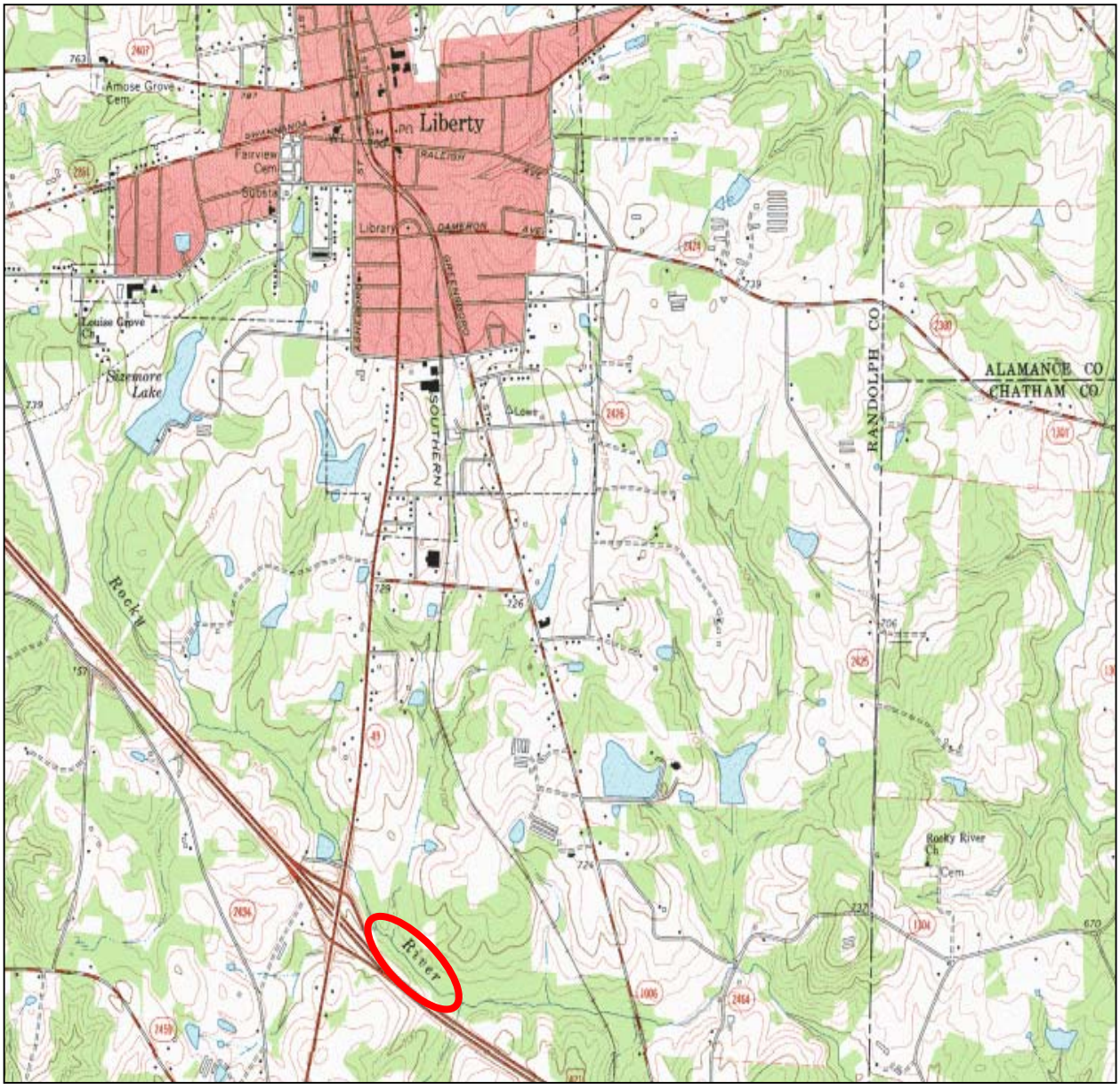


FIGURE 21

GENERAL LOCATION MAP
OFF- SITE WETLAND ENHANCEMENT- PARCEL No. 8735049459

ROCKY RIVER LOWER RESERVOIR EXPANSION
CHATHAM COUNTY, NORTH CAROLINA

Prepared By:
Dr. J.H. Carter, III & Associates
Southern Pines, North Carolina

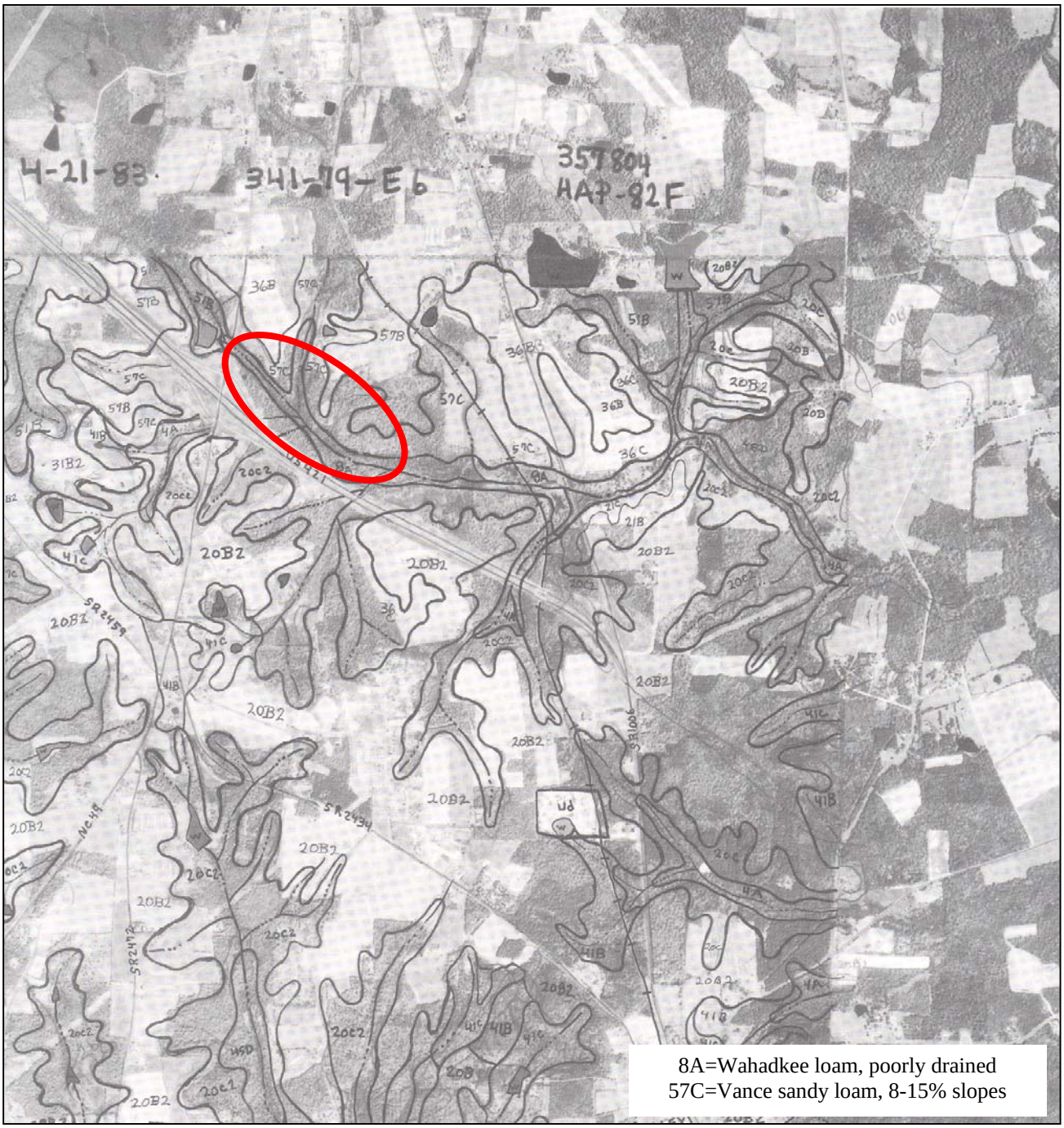
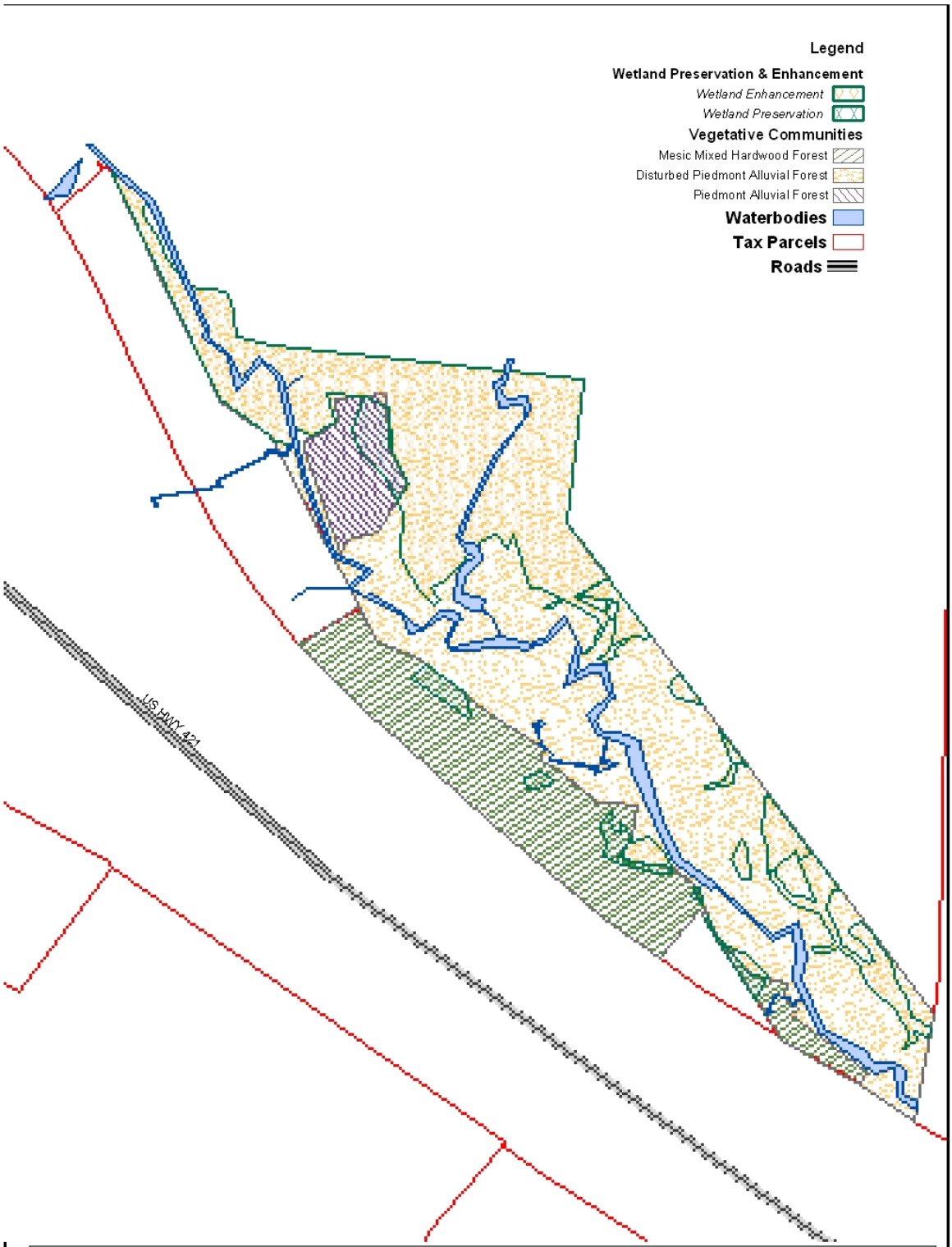


FIGURE 22

SOIL MAP FOR MITIGATION WETLAND SITE
PARCEL No. 8735049459
ROCKY RIVER LOWER RESERVOIR EXPANSION
CHATHAM COUNTY, NORTH CAROLINA

Prepared By:
Dr. J.H. Carter, III & Associates
Southern Pines, North Carolina


Legend
Wetland Preservation & Enhancement
Wetland Enhancement
Wetland Preservation
Vegetative Communities
Mesic Mixed Hardwood Forest
Disturbed Piedmont Alluvial Forest
Piedmont Alluvial Forest
Waterbodies
Tax Parcels
Roads
US HWY 421
April 29, 2004
FIGURE 23
PARCEL NO. 8735049459
WETLAND BOUNDARIES & EXISTING PLANT COMMUNITIES
ROCKY RIVER LOWER RESERVOIR EXPANSION
CHATHAM COUNTY, NORTH CAROLINA
Prepared By:
Dr. J.H. Carter, III & Associates, Inc.
Southern Pines, North Carolina
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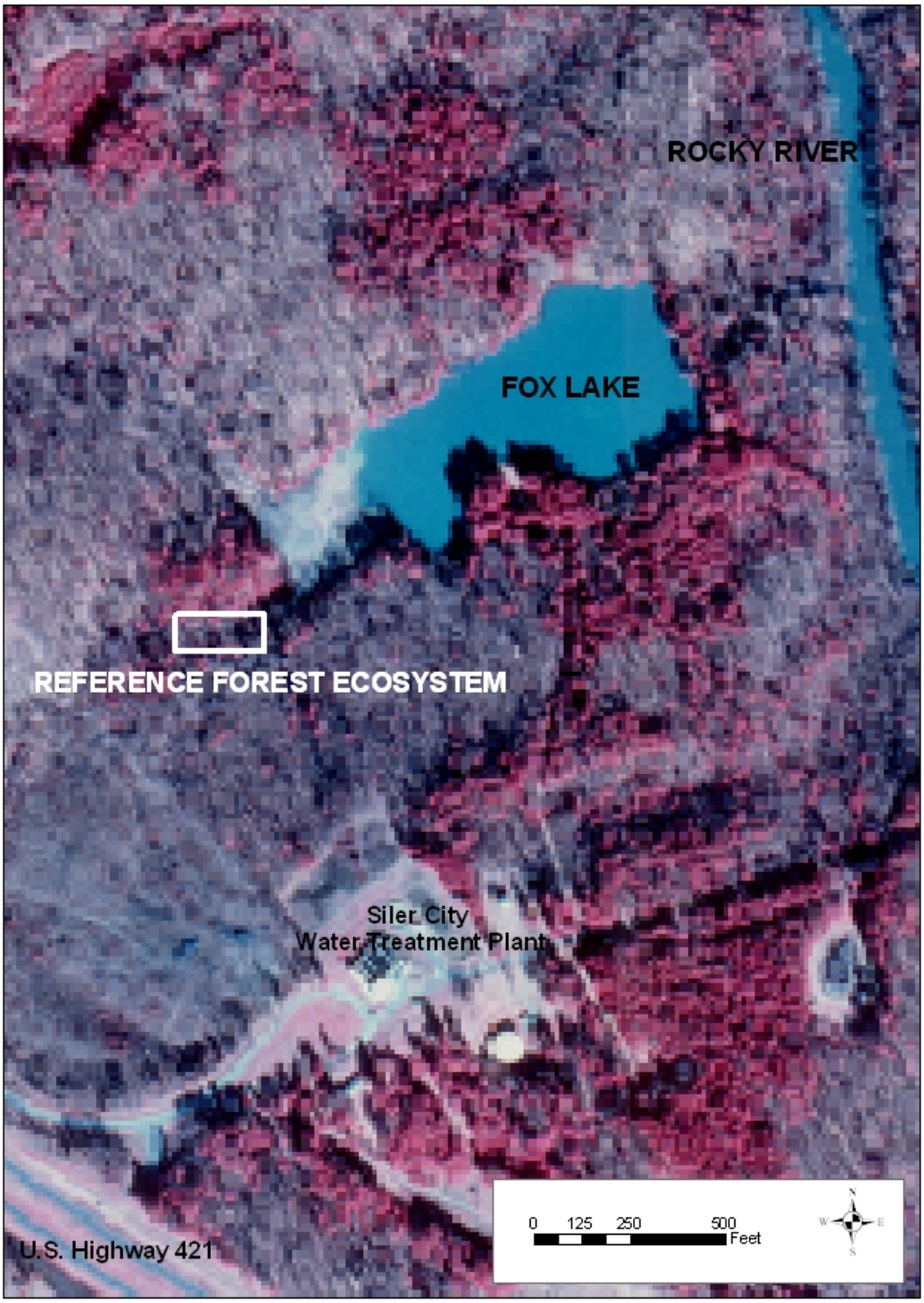
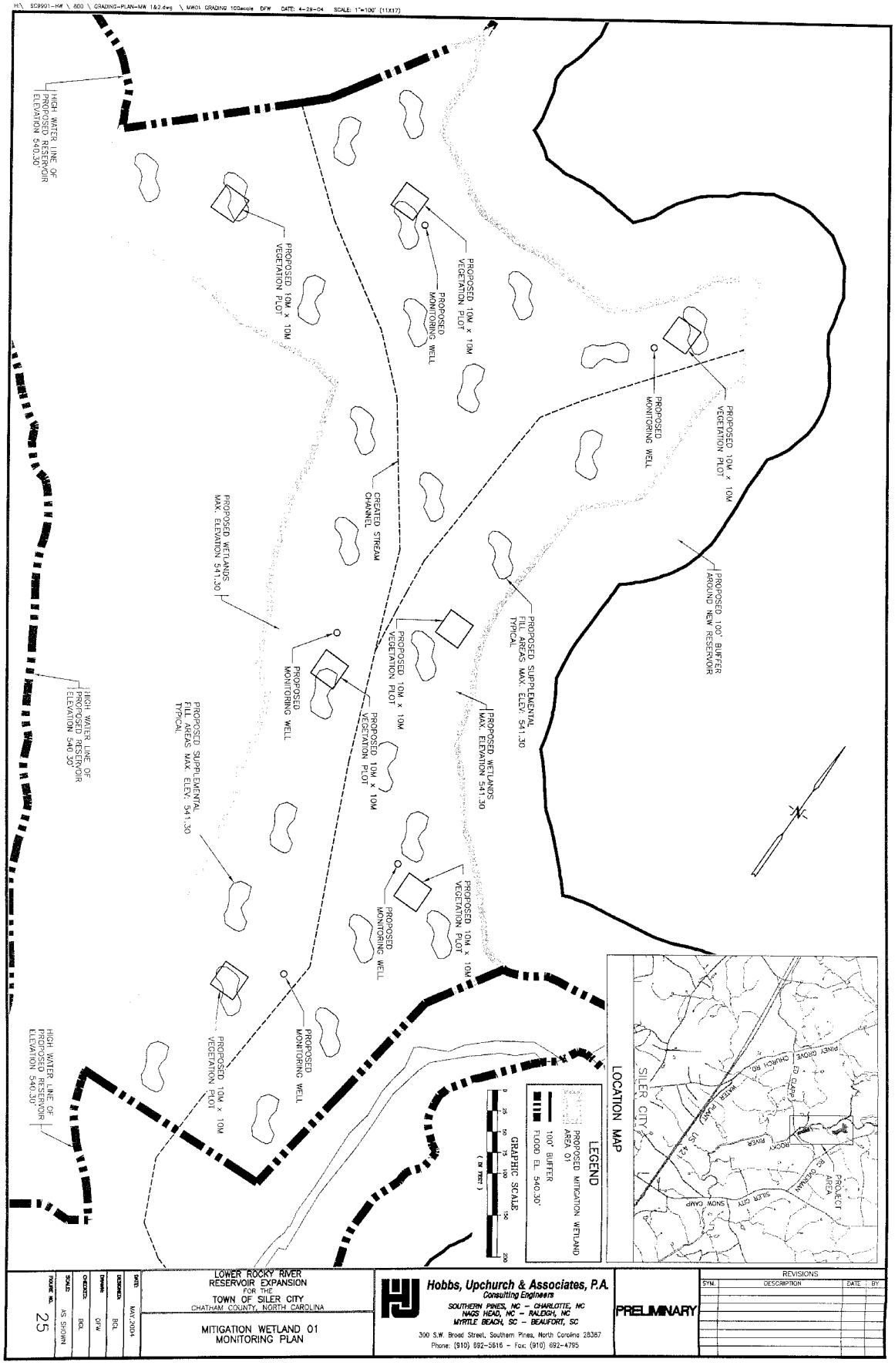
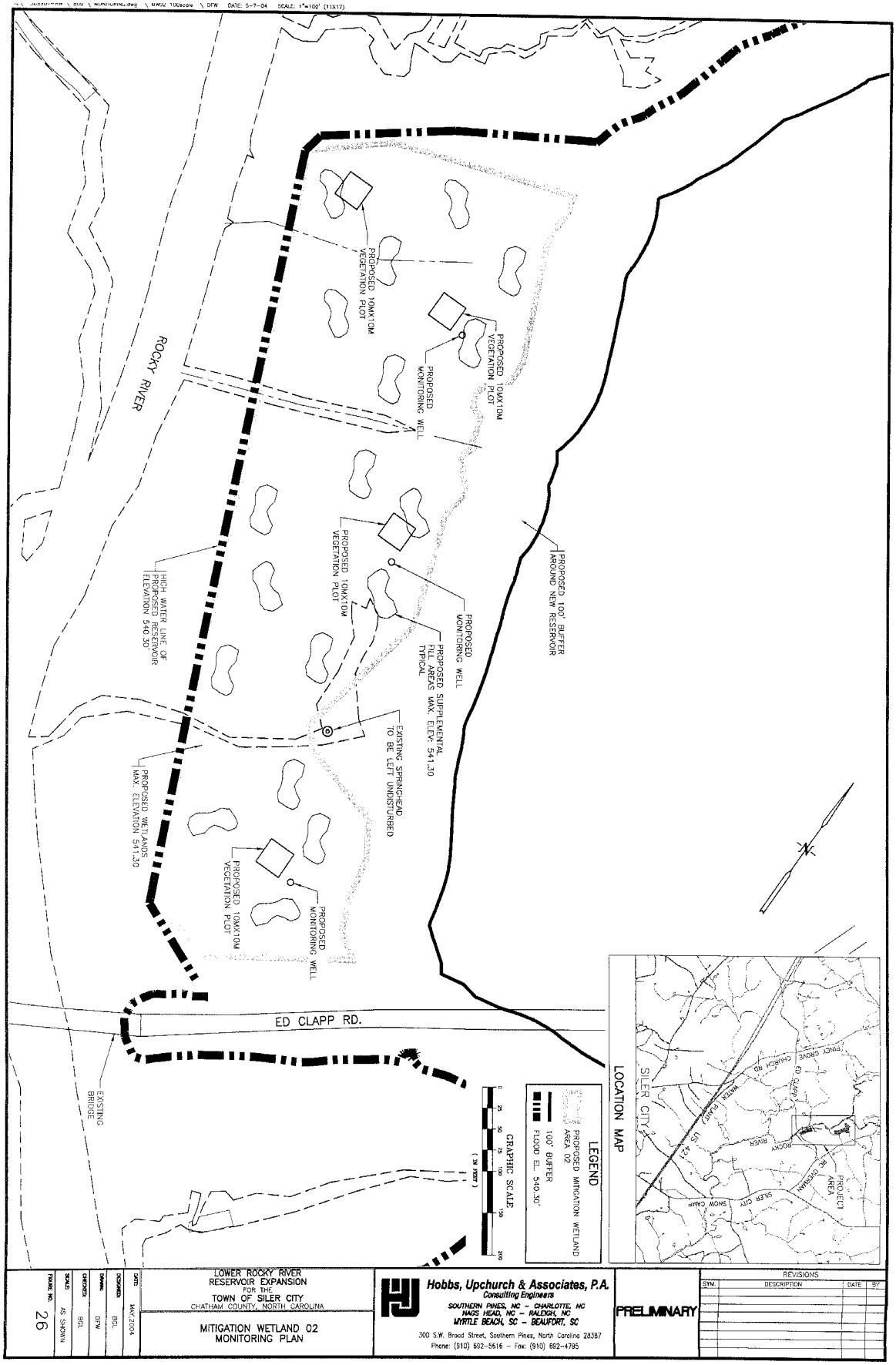


Figure 24. Location of Reference Forest Ecosystem (RFE) at Fox Lake, Chatham County, North Carolina.


H:\ SC8901-HW \ 800 \ GRADING-PLAN-MW 1&2.dwg \ MW01 GRADING 10Dec04 DPW DATE: 4-29-04 SCALE: 1"=100' (11X17)
HIGH WATER LINE OF PROPOSED RESERVOIR ELEVATION 540.30'
PROPOSED 10M x 10M VEGETATION PLOT
PROPOSED MONITORING WELL
CREATED STREAM CHANNEL
PROPOSED WETLANDS MAX. ELEVATION 541.30
PROPOSED SUPPLEMENTAL FILL AREAS MAX. ELEV. 541.30 TYPICAL
PROPOSED 100' BUFFER AROUND NEW RESERVOIR
LOCATION MAP
SILER CITY
US 421
PROJECT AREA
LEGEND
PROPOSED MITIGATION WETLAND AREA 01
100' BUFFER
FLOOD EL 540.30'
GRAPHIC SCALE
(IN FEET)
LOWER ROCKY RIVER RESERVOIR EXPANSION
FOR THE
TOWN OF SILER CITY
CHATHAM COUNTY, NORTH CAROLINA
MITIGATION WETLAND 01
MONITORING PLAN
Hobbs, Upchurch & Associates, P.A.
Consulting Engineers
SOUTHERN PINES, NC - CHARLOTTE, NC
NAGS HEAD, NC - RALEIGH, NC
MYRTLE BEACH, SC - BEAUFORT, SC
300 S.W. Broad Street, Southern Pines, North Carolina 28387
Phone: (910) 692-5616 - Fax: (910) 692-4795
PRELIMINARY
REVISIONS
SYM. DESCRIPTION DATE BY
DATE: MAY, 2004
DESIGNED: BDL
DRAWN: DPW
CHECKED: BDL
SCALE: AS SHOWN
PAGE NO. 25



LOWER ROCKY RIVER RESERVOIR EXPANSION FOR THE TOWN OF SILER CITY CHATHAM COUNTY, NORTH CAROLINA	Hobbs, Upchurch & Associates, P.A. Consulting Engineers SOUTHERN PINES, NC – CHARLOTTE, NC HILTON HEAD, NC – RALEIGH, NC MYRTLE BEACH, SC – BEAUFORT, SC 300 S.W. Broad Street, Southern Pines, North Carolina 28387 Phone: (910) 692-5616 – Fax: (910) 692-4795	PRELIMINARY	REVISIONS: SYM. / DESCRIPTION / DATE / BY
MITIGATION WETLAND 02 MONITORING PLAN			

PROJECT NO.	SCALE	DESIGNED	DRAWN	CHECKED	DATE
26	AS SHOWN	BDL	DFW	BDL	MAY 2004

At the fringe wetlands, enhancement sites and creation sites, vegetation will be characterized by species, prevalence and percent cover each year during the 5-year (or longer) monitoring period. At MW-01, 7 10x10 meter vegetation plots will be established. At MW-02, 4 10x10 meter vegetation plots will be established. Vegetation monitoring will occur in late summer or early fall before leaf drop.

All planted woody vegetation will be tagged with an identification number to ensure accurate monitoring results. Tree sapling survival will be monitored every year. All mitigation sites will be transected annually and dead saplings will be replaced during the 5-year monitoring period or until success criteria are met.

On-Site Stream Mitigation Sites

The stream enhancement areas will be monitored for 5 years. All woody vegetation planted will be tagged with an identification number to ensure accurate monitoring results. Tree sapling survival will be monitored every year. All enhancement areas will be transected annually and dead saplings will be replaced during the 5-year monitoring period or until success criteria are met.

The monitoring period may be extended beyond 5 years if stabilization is not accomplished. Any additional actions will be coordinated with the USACOE.

REPORTING

Wetland Mitigation Sites

An as-built report will be submitted to the USACOE and DWQ after the mitigation sites are constructed. The as-built report will include final elevations, plant species composition and numbers, sample plot and well locations and photographic reference points.

An annual report will be submitted to the USACOE and the DWQ by 31 January of each year during the 5-year (or longer) monitoring period. Annual reports will include a plot of the average ground water elevations in the mitigation site and reference areas, sample plot and water level monitoring stations and photographs of each monitoring plot. Results of the annual site walk-through will be reported, as well as, vegetation density and percent cover data. All data collected during the monitoring period will be summarized and the acreage of successful and unsuccessful mitigation will also be estimated.

Stream Mitigation Sites

Information from the stream channel enhancement sites will be reported in the annual report for the 5-year (or longer) monitoring period. Annual reports will include photographs of representative sections of stream channel and information on coverage and survival of any planted vegetative materials.

SUCCESS CRITERIA

Wetland Hydrology

The success criteria for wetland hydrology will be met when the hydrology in the restored/created wetlands meets the minimum criteria as specified in the 1987 USACOE Wetland Delineation Manual (USAC)E 1987) for a jurisdictional wetland. Criteria for wetland hydrology are met when the areas are inundated or saturated within 12 inches of the surface continuously for at least 12% of the growing season (approximately 32 days) under normal rainfall. Under drought conditions (as designated by the North Carolina Drought Monitoring Council) the wetland hydrology success criteria must be at a minimum inundation or saturation within 12 inches of the surface continuously for at least 5% of the growing season (approximately 13 days). The growing season for Chatham County runs from early March to late November (approximately 265 days). In general, success will emphasize establishment of wetland hydrology similar to that present in the RFE. The target hydrology will be +/- 3 inches of that in the RFE. A soil sample will be taken at the time mitigation installation is begun and each year thereafter and examined for hydric soil and wetland hydrology characteristics.

Wetland Vegetation

Vegetative success will be measured on all acres of creation and enhancement mitigation sites where the planting of woody vegetation is proposed. Success criteria for the vegetation will be met when at least 260 trees/acre of the approved planted species have survived for at least 5 years on at least 23.62 acres. Herbaceous vegetation such as soft rush and sedges are expected to naturally revegetate mitigation sites. Success criteria for herbaceous vegetation will be met when the percent of herbaceous groundcover is within 10% or more of that in the reference wetland. In general, success will emphasize establishment of hydrophytic vegetation similar to that present in the RFE. The final living numbers for earlier planted species may deviate 10 % from the initial planted numbers and still be considered successful for 75% of the planted species. The remaining 25 % of planted species may deviate more than that and still be considered successful.

CONTINGENCY PLANS

All aspects of the mitigation plan will be closely monitored throughout the 5-year (or longer) monitoring period and adjustments will be made to ensure success during that time frame. The purpose of monitoring is to determine whether the success criteria are being met and making adjustments to ensure that they will be met. As the mitigation plan is finalized, contingency plans will be expanded for each mitigation site.

REFERENCES

N.C. Department of Environment and Natural Resources, Division of Water Quality, Water Quality Section-Planning Branch. 2003. "North Carolina Water Quality Assessment and Impaired Waters List (2002 Integrated 305b and 303d Report).

Outz, Henry. 2002. Personal Communication. Chatham County Soil & Water Conservation District.

Schafale, M.P., and A.S. Weakley. 1990. *Classification of the natural communities of North Carolina, third approximation*. North Carolina Natural Heritage Program, Raleigh, NC.

U.S. Army Corps of Engineers. 1987. "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1, U.S. Army Engineer Waterways Experiment Station, Vicksburg, Miss

U.S. Department of Agriculture Natural Resources Conservation Service(a). Unpublished Soil Survey for Randolph County, North Carolina.

U.S. Department of Agriculture Natural Resources Conservation Service(b). Unpublished Soil Survey for Chatham County, North Carolina.